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Colonel B. W. Dunn, who for the last 20 months has done such invaluable work for the railways as chief executive officer of their Bureau of Explosives, has gone back to the war department, the secretary of war having resisted the earnest appeals of the railway men to have his leave of absence extended. The ways of a Washington department are past finding out, and we shall not criticise; but it would seem as though the railways which, as well as the war department, constitute a great public interest, in this instance presented very strong grounds for being favored. The conditions surrounding the transportation of explosives and inflammable articles were very bad. Colonel Dunn has improved them immeasurably. In such a complicated business the attainment of simplicity and uniformity were of the utmost importance, yet on the one hand the railways were scattered and unorganized, not knowing exactly what they wanted, while on the other the manufacturers and shippers were strong and jealous. Col. Dunn, with his experience as an officer and his rare knowledge of explosives, proved to be the diplomat who successfully guided the organization of the railways and simultaneously secured the confidence of the shippers. But he is still in the midst of his work and a new man will be at a great disadvantage. According to the precedents Colonel Dunn will by next July have the privilege of retiring, so it is difficult for the outsider to see the grounds for the tenacity exhibited at the war department. In another month, however, there will be a new administration, and it may be hoped that broader views will then prevail.

SELLING RAILWAY SUPPLIES TO JAPAN.

As a technical journal in the transportation field, this paper is not concerned with the general news features of the absurd agitation which is being carried on by a small group of California demagogues against Japan and the Japanese; but there is one way in which this demonstration comes very close to us. In 1903 this country exported $23,000,000 worth of goods to Japan, and in 1905, following the temporary depression of 1904, it exported 52 millions worth. In 1906, with abundant prosperity at home and the shops crowded with orders, we exported $35,000,000 worth of goods to Japan, and in 1907 $40,350,000 worth. The figures for 1908 are not yet available, but they will doubtless show a large increase, due to the natural desire of manufacturers to keep their shops open by foreign business at a time when domestic business is slack. These figures do not take into account our large exports of manufactured articles to China, Korea and Manchuria, orders for which are placed in this country by the Japanese engineers in control of railways and other enterprises in those countries. The orders of rolling stock are especially significant. For example, the Japanese administration of the South Manchurian Railway Company placed orders in this country for machinery, locomotives, cars, bridges, rails, etc., which amounted in 1907 to over $10,000,000. During the same year the American Locomotive Company secured orders from Japan for that country itself and for railways in other countries which Japan influences, for 250 locomotives, while within the last few weeks the General Electric Company has received orders for three 1,000-kilowatt dynamos and other electrical equipment for complete installation of power-houses for the operation of a branch of the Imperial Railways of Japan.

Japan formerly bought her railway equipment from England. In fact, from the beginnings, in 1880, until about 1900 England dominated both railway construction and equipment in Japan. Since that time the United States, in competition with Germany, has done most of the business. In 1901 Japan bought 39 locomotives from the United States; in 1902, 14; in 1903, 32; in 1904, 80; in 1905, 151; in 1906, 182, and in 1907, 270, these figures including also the equipment ordered from Japan for Japanese dependencies. These locomotives in 1907 cost over $6,000,000.

Japanese and Manchurian railways are now buying Pullman cars and many other adjuncts to railway operation besides locomotives, and the market thus presented has become of the highest importance to American manufacturers. It has been built up at great pains and cost, and depends, like all such foreign markets, more on good will than on any other single factor.

Japan has done her share well in the effort to further the spread of this good will. We have at hand a pamphlet by the *Kihin Kai* which, being interpreted, means the Welcome Society of Japan. This society, with a prince at the head of it, maintains offices for information in all the large cities of Japan, and its objects are to welcome foreign visitors and to render them every assistance and convenience, thus directly promoting foreign intercourse and commerce. The traffic thus fostered is reaching very important proportions, the goods which we import from Japan exceeding the goods which we export to it, but being principally raw materials, which are worked up in this country at great profit to our own manufacturers and merchants.

The export trade to Japan has already been hurt by the unfriendly spirit manifested on the Pacific coast. It would not require very much more of the present sort of thing to

turn Japanese purchases away from America entirely. The American people love a demagogue and are willing to spend large sums for his support, but 40 or 50 million dollars a year seems an excessive contribution to that purpose. Yet things are now very close to the parting of the ways, when the American people must choose between the revenue accruing from a vast and profitable trade with Japan and the glory which a half-dozen California agitators will take upon themselves if this trade is destroyed. The case is one where manufacturers, East and West, ought to speak loud and speak often, until the California legislators begin to feel lonesome.

"BY THEIR FRUITS YE SHALL KNOW THEM" — A REVIEW OF THE TWENTY-SECOND ANNUAL REPORT OF THE INTERSTATE COMMERCE COMMISSION.

If we are right in supposing that the members of the Interstate Commerce Commission consider themselves important factors in the "moral uplift" of which we hear so much nowadays, they will be pleased at having applied to them the scripture verse, "By their fruits ye shall know them."

Especially should it be agreeable to the members of the commission to be judged by their report to the Senate and House of Representatives made on the 24th of last December, as there is no doubt that in the last twelve months the commission has made more progress in its legitimate work than in any previous year. We have therefore critically examined this report with a view to ascertaining from it what we can of the qualifications and views of the members of the commission and those who are working for them.

The report, like most reports, is twofold. It purports to give to Congress an insight into the situation of the commission and also to make recommendations. A report of this kind should so present the situation that it can be readily handled by the person to whom it is addressed, and the first criticism that we have to make upon the report of the Interstate Commerce Commission is that it seems hardly likely that any member of Congress will have time to read and digest the 96 pages of this report so as to ascertain what the situation is. Far less does it appear that any member can readily find proper reasons for the recommendations to Congress with which the report deals.

It happens that the Interstate Commerce Commission has in its files the annual reports of all the railways of the country, many of them models in their way. These reports generally present the situation in a few pages which can be readily perused by the stockholder. These few pages are, of course, accompanied by many more pages of statistics and data, but these are so separated from the main report that the busy stockholder need only consult them when he has time to go into details. The commission's report must be read through to be understood. We gather from this that the members of the commission are men unused to large affairs, and that they have not familiarized themselves, despite their great advantages, with the methods in which such affairs are handled.

The report begins with an attempt, which we noticed some weeks since, to show that the financial depression is temporary, and that the earnings of the railways through the panic compared favorably with the normal for several previous years. This statement appears to have been inserted in some haste as it includes a somewhat ludicrous misprint in the advance copy. Certain results are reached, it says, "by subtracting gross earnings from operating expenses." Fortunately, the situation is not so bad that expenses generally exceed earnings. The commission intended to subtract expenses from earnings, and corrected its error in the regular report.

The optimistic feeling of the commission appears to be based largely upon the fact that the net earnings per mile for 1908, although less than for 1907 and 1906, were $15 more than in 1905. Taxes are not included, and when we come to examine the figures in the latter part of the report, we understand why. Taxes have increased far more than $15 per mile. If they had been included, the Commission would have had to go back to 1904 to find a worse year than 1908, and 1904 was not a good year.

The statement ends with the following words:

> "Railway traffic appears now to be rapidly approaching the normal level of the past few years, and this should be peculiarly gratifying to the public as a reliable assurance of the general business prosperity of the country."

As noted above, when taxes are considered, the figures noted appear to give very little ground for this statement. It appears to be especially insufficient when compared with figures shown on page 89, which indicate for the first quarter of the present fiscal year there was no improvement in the situation.

We may gather from the above that the commission is willing to make general statements as to facts without producing the figures to back them up.

This opening statement is followed by the somewhat mysterious caption "Operating Division," a term which we do not remember having seen in previous reports of the commission. After a careful examination of the whole report, we gather that the business of the commission is carried on by some five or six divisions and the one in charge of general correspondence is termed the "Operating Division." The other divisions are "Division of Claims," the "Division of Prosecutions," the "Tariff Division" and the "Division of Statistics," recently promoted to be a bureau and now termed the "Bureau of Statistics and Accounts." From the unexplained appearance of this heading we gather that the members of the commission are in such frame of mind they think everyone interested knows that they term their general office their "Operating Division."

The Operating Division reports a vast increase in cases before the commission, in investigations for purpose of reparation and also in formal complaints. It is nowhere hinted that this increase in complaints is at all the result of hard times. We think, if the members of the commission had consulted any railway man on this question, they would have learned that this increase in complaints of more than 100 per cent. was to be expected whenever traffic fell off. Every railway claim agent has had this experience in hard times.

One of the phrases under this heading appears to be unfortunate, although possibly it may illuminate the point of view of at least some members of the commission. It reads:

> "Many of these complaints are important and allege violations of every phase of the law, such as overcharges, excessive rates, discrimination, reconsignment rules, demurrage rules, validation of tickets, train service, car shortage, undercharge, Pullman rates, embargo, etc."

From this we can judge either that the members of the commission do not read their own report, or that they consider reconsignment rules, demurrage rules and even train service, violations of the law.

The report further states that in order to handle the informal complaints, it is necessary to consult the tariffs of the carriers. We are assured by a number of railway men that such of these complaints as have been reported to them have been sent without any reference to tariffs, and that they have often found it advisable to return copies of tariffs involved to the commission with correspondence. If this is so, it would seem that the habit of making general statements without absolute fact has spread to the Operating Department.

The report goes on to state that the number of letters prepared and mailed in the year has increased from 66,070 to 102,159, or 55½ per cent. We have spent some little time over this perhaps unnecessary percentage figure and cannot persuade ourselves that the arithmetic of the commission is correct. This error is not changed in the formal report. From this we might judge that the members of the commission, being unused to substantiate their statements by facts, are careless about such facts as they care to use.

In speaking of the informal complaints the report states that 4,640 were taken up with carriers and that 3,515 of these were adjusted. It would be interesting to know how many of these adjustments were in favor of the complainant and how many

in favor of the railway. The general feeling among railway men is that the result of most of these informal complaints is to justify the railway. If this be the case, it would seem that the commission is sometimes unwilling to do justice to the railways when it has an opportunity.

The work of the Division of Claims shows a large increase in business, reparation having been allowed in 1,012 cases, against 561 the previous year. Here the commission is candid enough to state that 864 claims were rejected, while the previous year only about 200 were denied. This increase is again an indication of the realness of the hard times. In hard times shippers make claims that they would not notice in good times.

In the report of the Division of Claims there is injected a somewhat self-laudatory statement to the effect that the commission is practically abreast of its work. This statement, in the final copy, is transferred to the Operating Division—another indication of haste in preparation. We are glad to agree with the commission that it is disposing of its cases more promptly than it did, but when it claims that ordinary reparation claims "are usually settled by it in from one-quarter to one-half the time in which similar claims are settled by the claim departments of the many railway companies," it is going a good way. No one has criticized the claim departments of the railways more severely than the *Railroad Age Gazette*, but we feel that it is possible to find more than one railway company which is handling its claims as promptly as, if not more promptly than the commission. The commission appears to consider it safe to make such statements without particulars or details.

In this passage reference is made to an unexplained "unification and co-ordination" of the several branches of the commission's work. The paragraph closes with the following:

"In fact, the information necessary to intelligent action by the commission can frequently be obtained from a verbal interview with the head of the appropriate division, and in a great many instances no further research is necessary. In this connection it should be remembered that for the head of its tariff and statistical divisions the commission has chosen practical railroad men."

After gasping at the error in grammar in the last sentence, the average railway man will begin to wonder when Professor Adams graduated into the railway profession. Further reading of the report, however, suggests the possibility that Professor Adams, at the head of the Bureau of Statistics and Accounts, has a practical railway man under him in charge of what was at one time the Division of Statistics.

Here again we are confronted by the indication that the commission must be composed of gentlemen who do not read their own report. No member of the commission is capable of the error in grammar, and all of them must know of the change in their organization recorded on page 82.

The report continues by a reference of the commission to its settling cases on evidence that would not be considered in court, giving as a reason for this the fact that every decision of the commission involves rights of parties who are not present. What this has to do with it is not by any means clear. There is hardly a case in court involving the interpretation of a new law which does not affect many parties beside those present. Dealing as it is with the interpretation of a new law, it would seem that the commission should be unusually careful in the admission of testimony.

Before proceeding to the consideration of the work of its Tariff Division the report interpolates an argument for changing the law. The commission feels that it should have authority to restrain railways from advancing rates, pending proceedings. The argument is entirely from the point of view of the shipper. It appears to assume that any advance imposes "an additional burden." Does not the commission know that many rates are now so low as to impose excessive burdens on the railways? This is the first of the seven recommendations of the commission. They are summarized at the end of the report, but the arguments are so scattered that, as we have noted above, it is very hard to find them. Just why this argument should come in this particular place in the report it is hard to say.

It is followed by the report of the Tariff Division. There is no doubt that the Tariff Division of the Interstate Commerce Commission has done a great work in simplifying the tariffs, and especially the freight tariffs, of the roads, and while one might object to a phrase or two in its report, we must conclude from its business-like nature that the Tariff Division is, on the whole, well and efficiently conducted.

This report is followed by an account of the difficulties arising from misquotation of rates. That there are such difficulties we must all agree, but to get rid of these difficulties without opening the way for rebating is a hard thing to do. We therefore approach the commission's recommendation with great interest, and are correspondingly disappointed that the commission meets the question by urgently requesting Congress "that a suitable measure be promptly enacted." No details are given.

From this we may fairly judge that there are men on the commission who are willing to rid themselves of responsibility in a purely technical matter by a simple and easy reference to Congress.

The Commodities Decision is then discussed, and the following words are used, which necessarily are not backed up by facts:

"A considerable number of carriers are owners of and dealers in commodities carried by them. Such carriers succeeed, in practically every case, in monopolizing, or at least dominating, the markets in which they deal."

The commission appears to have had anthracite coal entirely in view, as the statement does not apply even to bituminous coal and much less to other commodities owned by carriers.

The discussion of the Harriman decision, which follows, shows that the commission is not at one with the Supreme Court. The lines are closely drawn:

"In the opinion of this commission, when Mr. Harriman assumes control of the Union Pacific Railroad he ceases to be a private individual to that extent and can no longer claim protection, which, as a private person engaged in a strictly private pursuit, he might insist upon.

"The Supreme Court, however, is of the contrary opinion, and the commission can, of course, only suggest to Congress that if there is to be any full investigation by the federal authorities of these financial dealings some action must be taken by the Congress."

The situation is grave. Nothing so grave has happened since the momentous event recorded in the "Bigelow Papers," "My, ain't it terrible! What shall we do?"

But, joking aside, it is serious if the Interstate Commerce Commission feels that under any circumstances, it should have the right to institute an inquisition into the proceedings of a private party who is not under suspicion of having broken any law. It is serious if the opinion of the Supreme Court has no weight with the commission.

The commission's only basis is a law. What excuse can it have for assuming a position above all law and above the Supreme Court?

To be sure, the members of the commission are removable by the President, but interested as the President is in "moral uplift," superior to law as he may feel himself, he has never removed an officer of the government for any act except an illegal one. As we have noted in many cases, the report throws light upon the composition of the commission. Here it throws not only light but mystery.

It is a relief, of course, to find that the commission cannot give Congress any definite recommendation. "If there is to be any full investigation * * * some action must be taken." It sounds fierce, but if it is not a tumble it is rather a hasty dismount from the high horse. The Supreme Court is saved! This is the third so-called recommendation, and the second indefinite one.

We next have an account of the suits by carriers to annul orders of the commission. It is, as the commission states, a significant fact that while such a suit had only been filed once before July 1, 1905, sixteen suits have been begun since that date. This means that the Hepburn Act is being tried

out in the courts, or perhaps, that the assumptions by the commission of what is law under the Hepburn Act are being tried out. It will be remembered that when the original act was tried out in a series of legal tests, the railways won by far the larger portion of the suits, and we anticipate a similar outcome in the present procedures. The fact, so plainly stated in the account of the Harriman case, that the commission does not agree with the Supreme Court as to law, is possibly an indication in this direction.

The next 40 or 50 pages of the report, are, with few exceptions, accounts of legal proceedings of one and another kind. The Division of Prosecutions gives a full account of their work, and for the first time we find a real legal tone in the report and a thorough regard for the opinions of the courts, the prosecutors appearing to take their reverses in a professional way.

This report of the Division of Prosecutions is followed by one on the safety appliance law, which indulges in some curious grammar and still more curious assumptions. Speaking of the commission it says "their belief," which is not only ungrammatical but confusing, as the plural has heretofore been used for the railways as against the commission.

In this portion of the report the position is taken that the safety appliance law applies to all cars and equipment hauled by carriers engaged in interstate commerce. One judicial opinion given verbally is alluded to as in favor of this somewhat extreme view, but in the next, that of the Wheeling & Lake Erie, Judge Taylor is quoted distinctly as saying that the law only applies to cars whether they carry interstate traffic themselves or are hauled in a train which contains interstate traffic, which is quite a different thing. A number of other cases are quoted apparently without much regard to what is proven, and on page 46 we find the following opinion:

"162 Fed. Rep., 775." "If the defendant did not at such time and place have the requisite means to repair such defect, then it has the right, without incurring the penalty of the law, to haul such car to the nearest repair point where such defects can be repaired."

If this latter doctrine stands the law will become much more sensible than has generally been supposed. It is to be noted that no reference is made to the "interchange agreement" which has figured so prominently in the later reports of the commission. As we noted some months since, the commission has discovered that the "set back" at points of interchange, is illegal.

The report of the Block Signal Board we have already noticed, and there is little to say of the report on Railway Accidents and Transportation of Explosives, where the commission has closely followed the rules of the American Railway Association.

The other recommendations are as follows: That the commission's authority in respect to hours of service be made more definite. A third indefinite recommendation! A study of the report indicates that the commission wants to be assured of its power to demand reports and further that it wants certain explanations for failures to comply with the law ruled out. Among these "excuses" are "drawheads pulled out" and "broken air hose." Evidently this part of the report is not written by the commission's safety appliance expert.

After these three indefinite recommendations, it is refreshing to meet the fifth, on the block signal system—eight cogent lines covering the whole subject.

The sixth recommendation asks for power to allow carriers to destroy their records after a remarkable lapse of years, which is, of course, eminently desirable.

The last recommendation is a double-header. It asks for a physical valuation of railway properties and for the supervision and control of railway capitalization. There are three pages of familiar argument on these points, but no definite suggestion as to how the valuation can be fairly or even accurately made—no indication of a proper method for controlling capital—Congress must depend again upon its own wisdom.

The commission is then made of men who are willing to make in all seriousness, eight recommendations to Congress, of which only three are definite. In these three cases the commission knows what it wants, and two recommendations are certainly good. In the other five the commission is impelled to ask for something it knows not what: "Let us make a physical valuation of the railways," it says, "and tell us how." "Let us control the railways' capital," it says, "and tell us how." "Let us enforce the hours of service act better," it says, "and tell us how." "Let us relieve shippers, and shippers only, from the consequences of error," it says, "and tell us how." "Let us institute inquiries into all private acts of all railway men, even if they be legal," it says, "and tell us how."

In the discussion of the hours of service law, statement is made that the commission has required reports under oath rather than obtaining information through secret investigations by government inspectors, believing this method to be "more in consonance with American ideas and institutions." We gather from this that the commission still feels that its methods and desires are still American.

This seems strangely in contrast with the report of the Bureau of Statistics and Accounts, where on pages 82 and 84, the following statements are made, savoring of a European bureaucracy:

"It is regarded as a significant fact, and one which suggests the possibilities of supervisory control which lie in the administration of a prescribed system of accounting for public service industries, that the further accounting orders of the commission involve broad and comprehensive questions of public policy."

"When, however, all has been said along these lines that may properly be said, it nevertheless remains as a fundamental proposition that the actual investment in an enterprise needed for giving the public adequate transportation facilities is entitled to and should have a reasonable return, and no more than a reasonable return, in the form of a constant profit; and a reasonable schedule of rates is one that will produce such a result."

These passages indicate that the impression is prevalent even in the Bureau of Statistics and Accounts that the commission is above the law. There is nothing in the law giving the commission "supervisory control" of the railways. There is nothing in the law stating that a railway investment should have no more than a reasonable return, and yet these assumptions are calmly made as if covered by common or statute law, Apparently the bureau has not read or understood the opinion of the Circuit Court of the United States for the Northern District of Illinois. "In no proper sense is the public a general manager."

Enough has been said to show that the commission is still engaged in "sowing the wind." As we have indicated, we have little doubt as to the crop. We trust that in the whirlwind that is bound to encompass it, the commission will be able to hold to the good work it has done, especially in the last few years, that it will be able to maintain equal rates to all and that it can secure equal regulations and facilities for all. We trust that the whirlwind will only blow off the deadwood and will leave the commission its flourishing stock, amenable to all the laws of nature and of the land.

RAILWAY CHARTERS VERSUS STATE LAWS.

The basic line of a large railway system in this country, generally speaking, has been the localized property of a corporation operated at first within state bounds and under a single state charter. As the single line has taken to itself connecting and subsidiary lines and grown into a system often operating through several states, it has sometimes modified the original charter to fit, if possible, the extensions. It has sometimes taken out or held charters in more states than one. It often has formally assumed rights, privileges and, by implication at least, the charter responsibilities also, of the companies absorbed; and it has in other cases carried through consolidations under the express proviso that the rights of the parent charter shall control except as against state enactments relating merely in practice to such methods as intrastate operation, rates, lay-outs, physical condition and matters bearing directly on public convenience and necessity as dis-

tinct from such larger subjects as financing and consolidation. All the foregoing conditions have their legal and, as experience is proving, not seldom, their constitutional questions, state and national. But the situation becomes peculiarly complex when a railway system operates under double or multiple charters in two or more states.

The subject has been brought into sharp focus by the recent action of Attorney-General Malone, of Massachusetts, who has officially set before the Massachusetts legislature the question of compelling the New York, New Haven & Hartford to forfeit its Massachusetts charter. Stated with the utmost brevity and personifying the Attorney-General in the commonwealth, Massachusetts claims that when the railway corporation accepted some 37 years ago a Massachusetts charter—at the time of the merger of the lines from New York to Springfield—it accepted also Massachusetts law as applied to its whole policy and procedure, intra-state and extra-state, except, of course, as affected by federal law and jurisdiction. Such is not the exact form of the Massachusetts claim, but such is its logic and its clear implication. Certain things done by the New Haven corporation, it is therefore asserted, opens it to charter forfeiture. The corporation, on the other hand, asserts that, as a Connecticut corporation, it had a right to do those things, Massachusetts statute to the contrary notwithstanding; that the Massachusetts jurisdiction is localized not extra-state; and that the Massachusetts charter is a limited one, subordinate to the Connecticut (parent) charter, and, in fact, accepted by Massachusetts subject to the Connecticut charter powers and privileges. In other words, to put the case concretely, that Massachusetts has no purview of such general acts as an increase of capitalization, or the merger of a Connecticut or Rhode Island subsidiary line, or the financing of a New York terminal. It finds timely support for this contention in the resolution, aimed at the policy of Massachusetts, which is now before the Connecticut legislature.

The broad scope of the questions raised is obvious as well as their intricate character under the conditions where multiple charters are held in more than one state. In such cases does or does not the original charter control, and if not, what are its scope and bounds? A good deal, of course, depends upon the terms of multiple charters, but even when they are pretty specific, new railway statutes—and in these days they are abundant—make law and charter privileges in different states clash. It is often so with a single charter in one state, it is more so with double charter in two states. One can, of course, see natural and commonsense limitations, mostly physical. A state, within its own bounds, has natural and fundamental control of physical matters and legal regulation of rates. But what are its powers under a secondary charter, as contrasted with a primary charter, the latter, perhaps, giving extraordinary privileges? On the one hand we may have a railway corporation claiming under an outside charter powers *within* the state subversive of the whole policy of the state. On the other hand we may have the state asserting—as in Massachusetts—authority which not merely—if successful—would obstruct or check the natural policy of development of a great railway system, but arouse antagonism between states themselves when their statutory railway polities diverge. The same problems, to a certain degree, arise in the case of other corporations than railways with liberal, not to say licentious, charters, and doing business in non-charter states. But in such instances the question is not complicated by a big operating plant like a railway, with its relations of public service.

In a subject so big and broad, so cloudy in its precedents and policies, yet growing steadily in importance, the Massachusetts example introduces us to yet another phase of the question. The Attorney-General of that state says without qualification that the acts of the New Haven Company have, in law, forfeited its charter; yet, in deference to the great vested interests at stake, he shrinks from pushing the matter in the courts, and asks the legislature to act instead. It is no wonder that he pauses. The New Haven corporation, with only a half dozen miles of track actually owned in the state—between the state line and Springfield—has more than half of its 16,000 stockholders residents of Massachusetts, and probably an even larger ratio in the state holding its bonds and leased line shares combined. Yet primarily the question is a judicial one resting on existing statutes of the state of pretty long standing; and it is hardly a secret that the New Haven company would not be averse to surrendering its Massachusetts charter and falling back upon its "omnibus" charter granted by Connecticut. Here we have the new aspect of the matter, with its suggestion that a railway corporation of multiple charters may drop one or more of them with an actual increase of valid powers. An act of incorporation originally intended to strengthen has become, by one of the paradoxes of time, an element of weakness and a thing to be dropped. Such a policy tends to invite popular and legislative hostility and may not be prudential in the long run, even though it gives the corporation firmer foothold in the courts. But it raises another of those manifold railway problems bearing on interstate jurisdiction and policies which are making many people in these days talk of federal charters to replace those of the states.

SOUTHERN PACIFIC COMPANY.

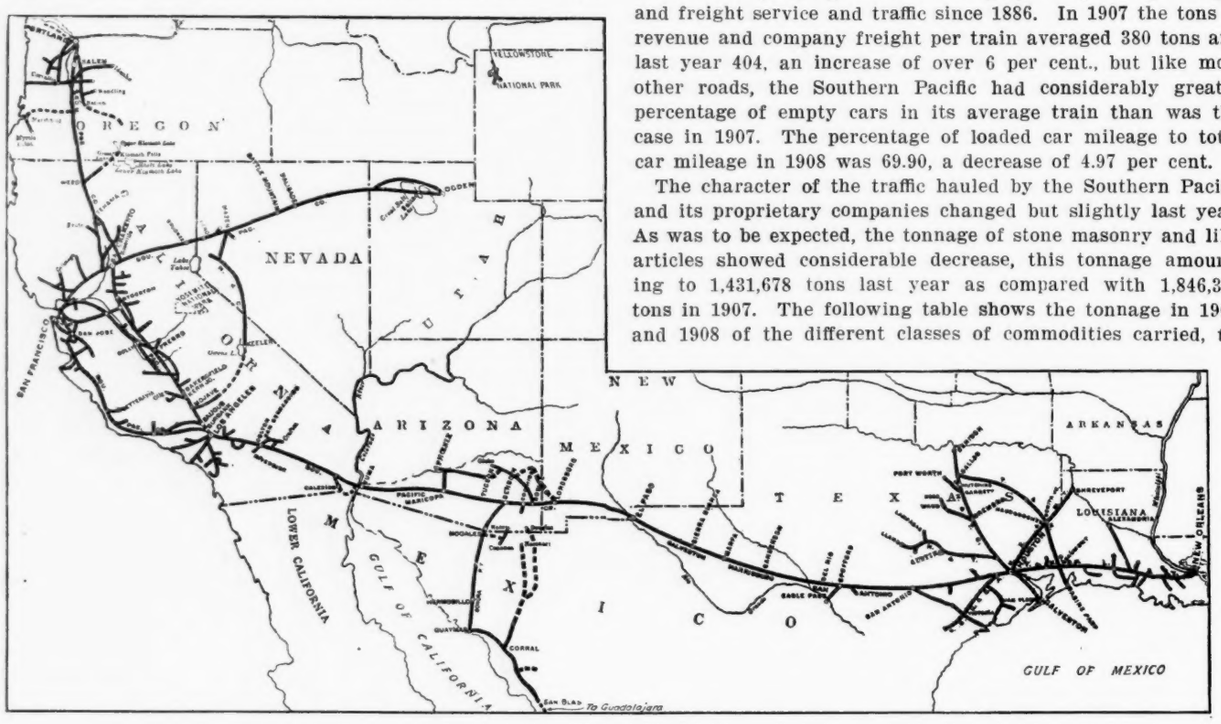
Almost without exception, the annual reports for the fiscal year ended June 30, 1908, previously reviewed in these columns, have made some mention directly or indirectly of delays to extensions and additions caused by the general business depression. The report of the Southern Pacific Company not only makes no mention of the holding up of extension work, but the figures given indicate that this work was not delayed on account of hard times. The Southern Pacific and its financial management are strong enough to carry through a plan of extension once adopted, and leave the financing of the work to be done after the return of prosperity. There has been $61,146,399 advanced for construction and acquisition of new lines up to June 30, 1908, of which $21,268,403 was advanced in the 1908 year. The total sum advanced for new lines, terminal real estate and rolling stock up to June 30 amounted to $103,332,585. In this connection it is of interest to note that the sums required for temporarily financing the work of building the railways in Mexico were secured in part from the Union Pacific. On June 30, 1908, $45,376,389 had been thus obtained. Of this amount, $20,200,010 has since been repaid. It is obvious that only the strongest companies can build new lines and finance the work subsequently, but it is equally obvious that where this is possible it is an economy.

The total revenues of the Southern Pacific Company and its proprietary companies, after excluding all offsetting transactions between them, amounted in 1908 to $123,276,921, as compared with $126,194,360 in 1907. This is a decrease of $2,917,439, or a little over 2 per cent. The entire decrease came during the last six months of the fiscal year. Previous to that there was an increase of $6,975,042, so that the shrinkage in the six months of depression amounted to $9,892,482.

As was pointed out in the report for the 1907 year, the company was so burdened with new traffic offered that new business ceased to be profitable. Expenses mounted more rapidly than revenue, and this was particularly true of the first half of last year, so that when the business depression began to be felt, it naturally took some time to readjust expenses. Total operating expenses amounted to $84,663,052 in 1908 and $80,265,332 in 1907. This is an increase of $4,397,720, or about 5.5 per cent. The rail lines operated on 66.94 per cent. of gross revenue basis last year as against 61.52 per cent. in 1907. Not to be outdone by the demands of labor or the increase in cost of materials, the tax commissioners assessed the company $3,950,140 for taxes last year, as compared with $2,896,501 in

the previous year, which is an increase of over 36 per cent.

These increases in expenditures and decreases in revenues left the company with $34,663,729 net revenue after the payment of taxes in 1908, as against $43,032,527 net revenue in 1907, a decrease of $8,368,798, or about 19.5 per cent. The income from sources other than transportation operations remained about the same, while fixed charges decreased slightly, leaving $19,893,473 earned on the preferred and common stock as compared with $27,698,593 available for dividends in 1907. This is a decrease of about 28 per cent. The dividend rate remained unchanged on the preferred stock, being 7 per cent. paid on $55,711,755 stock outstanding at the beginning of the year, and 7 per cent. on $19,154,708 stock issued during the year. The rate on the $197,849,259 common stock was 6 per cent. in 1908 and 5¼ per cent. in 1907.



Southern Pacific.

The increased expenses were the result not only of the manner in which business was divided between the first and second half of the year, but also from the increased cost of materials and labor, and from the expenses incident to restoring to its former standard condition the roadbed damaged by disastrous floods in the spring of 1907. There had been a 23 per cent. increase in the cost of ties in 1907, and last year this cost increased from an average of 58 cents to 70 cents per tie; and there were also 1,164,705 more ties placed in roadbed in 1908 than in the previous year, making the total last year 3,948,608, equal to 1,410 miles of continuous track, or 11 per cent. of all ties in track. The cost of fuel per locomotive mile in revenue service and non-revenue service, "for which the expenses are charged to conducting transportation," was 17.813 cents per mile run against 13,353 cents in the preceding year. This was the result of an increase in the cost per ton of coal and fuel oil from $2.13 to $2.70, or about 27 per cent. It was in the unproductive expenses of conducting transportation that the largest increases came, but there was no attempt made to cut maintenance charges to the detriment of the up-keep of the property, as the following table shows:

	1908.	1907.
Maintenance of way and structures*..	$1,746	$1,674
Repairs of locomotives	3,090	3,444
Repairs of passenger-train cars	894	790
Repairs of freight-train cars	92	87

*This is average per mile of main and second track.

In addition to these liberal maintenance charges, there was spent for building of new lines, for equipment, and for additions and betterments to completed lines, $7,312,882, and charged to capital account. Beside this sum, there was spent $6,557,263, of which all but $282,952, charged to the Southern Pacific Company's income account, was charged to capital account of the proprietary companies for additions and betterments. A part of this sum was spent for the installation of 760 track miles of automatic block signals and the rest for general betterment.

The accompanying charts show graphically the passenger and freight service and traffic since 1886. In 1907 the tons of revenue and company freight per train averaged 380 tons and last year 404, an increase of over 6 per cent., but like most other roads, the Southern Pacific had considerably greater percentage of empty cars in its average train than was the case in 1907. The percentage of loaded car mileage to total car mileage in 1908 was 69.90, a decrease of 4.97 per cent.

The character of the traffic hauled by the Southern Pacific and its proprietary companies changed but slightly last year. As was to be expected, the tonnage of stone masonry and like articles showed considerable decrease, this tonnage amounting to 1,431,678 tons last year as compared with 1,846,381 tons in 1907. The following table shows the tonnage in 1907 and 1908 of the different classes of commodities carried, together with the percentage of tonnage of each class to the total tonnage:

	1908. Tons.	1908. Per cent.	1907. Tons.	1907. Per cent.
Products of agriculture	4,614,426	20.20	5,112,185	20.81
" " animals	905,444	3.96	888,228	3.61
" " mines	6,841,931	29.96	7,190,094	29.26
" " forests	4,314,329	18.89	4,703,781	19.14
Manufactures	3,694,071	16.17	4,088,507	16.64
Other commodities.	2,470,203	10.82	2,588,697	10.54

There is no combined balance sheet shown for the Southern Pacific Company and the proprietary companies. A balance sheet for each proprietary company is shown separately and the fullest information is given. The Southern Pacific annual reports for years have been a model in respect to the completeness and frankness with which the company's affairs are shown. Current liabilities of the Southern Pacific Company as of June 30, 1908, amounted to $74,195,164, as compared with $48,330,482 on June 30, 1907, the large increase in liabilities being in the loans and bills payable, which amounted to $52,472,648 last year, an increase of $28,062,873 over the previous year. Current assets amounted to $25,918,748 on June 30, 1908, as compared with $23,773,761 on June 30, 1907, the largest increase in current assets being in the value of material, fuel and other supplies, which were carried at $10,541,985 last year as against $9,160,125 in the previous year. Cash decreased from $6,774,618 to $5,763,466.

The total current assets of the proprietary companies amounted on June 30, 1908, to $8,915,772, and the total current liabilities amounted to $4,553,403, both the liabilities and the assets showing a small decrease from the figures for 1907.

The growing floating debt of the Southern Pacific Company

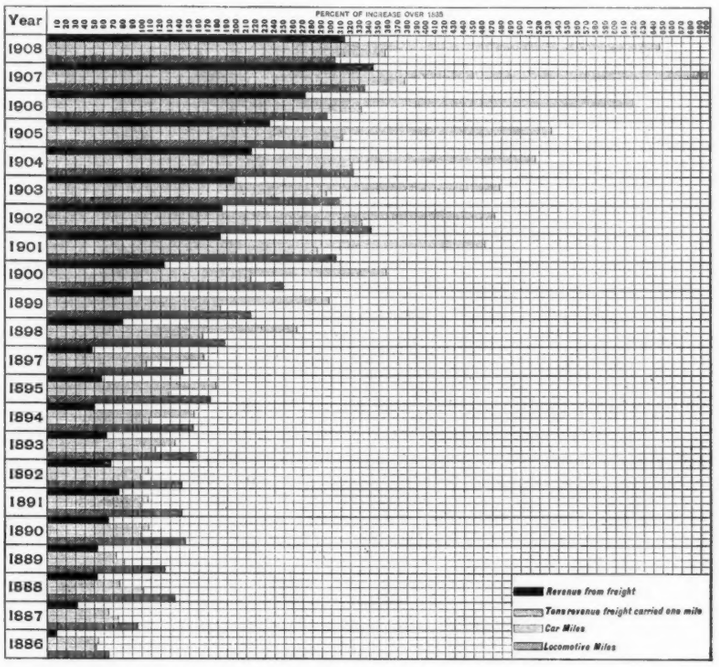
and the excess of current assets over current liabilities, with the decrease in cash, simply indicates that in the near future the company will necessarily issue new securities or sell some of those that it now holds in its treasury. On June 30 the company owned free $92,901,890 par value of stocks, of which $33,508,066 were stocks of proprietary companies and $59,393,824 were stocks of other companies, and it is interesting to note that $18,337,336 were stocks of oil companies. Bonds amounting to $38,662,300 are held free in the treasury, of which $21,428,000 are bonds of proprietary companies and $17,234,300 are bonds of other companies. In addition to these stocks and bonds there are $22,747,000 Southern Pacific Company 2-5-year 4 per cent. bonds held in the treasury. The amplitude of these resources is fully apparent, and it would seem that the permanent financing of the floating debt will finally depend largely on the securities' market.

There were sold during the year Central Pacific first refunding mortgage 4 per cent. bonds amounting to $14,903,000. These bonds were held as collateral for notes to the United States, of which the last was paid in February. The total payments on these notes during the year amounted to $5,881,272. In connection with this matter, President Harriman says:

"The discharge of this debt marks an epoch in the history of the Central Pacific. By an act of Congress in 1862, the 'Central Pacific Railroad Company was authorized to build a railway from Sacramento to a junction with the Union Pacific, and was given fourteen years to complete the road. This junction was effected in May, 1869, and in the fall of that year the entire rail line from Ogden to San Francisco Bay was in operation. The gross earnings in the year 1870 (the year following the opening of the entire line) amounted to $7,438,970 on the 894 miles operated; and in the year 1899, in which the final settlement with the United States government and readjustment of the company's bonded and other indebtedness was effected, the gross earnings amounted to $16,401,026 on the 1,359 miles operated. Since the readjustment of this debt, February 1, 1899, there has been expended to June 30, 1908, in straightening the line, in reducing grades and curvatures, and in other reconstruction, in the construction of the Ogden Lucin cut-off, referred to in the annual report for 1903, and for other betterments and additions by which the service and facilities to the public were increased, the sum of $34,270,680. The gross receipts for the year ended June 30, 1908, for the 1,495 miles of railway operated amounted to $33,456,141."

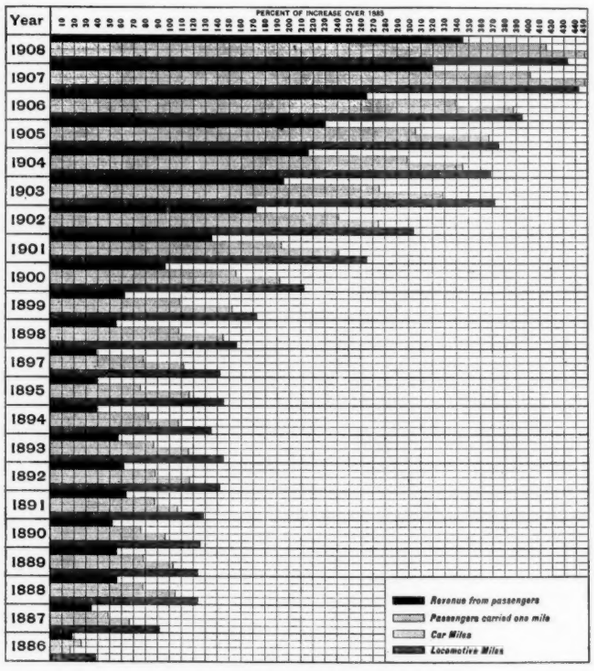
Since June 30, 1908, the Southern Pacific earnings have steadily increased and expenses have been reduced, making the prospect for the present fiscal year good.

The following table shows the results of operation for the fiscal years ended June 30, 1908, and June 30, 1907. The figures have been rearranged so as to make comparison between the two years possible:



Freight Service and Traffic on the Southern Pacific.

Locomotive miles include revenue freight train miles, three-fourths of mixed train miles and helping freight train miles.



Passenger Service and Traffic.

Locomotive miles include revenue passenger train miles, one-fourth of mixed train miles and helping passenger train miles.

	1908.	1907.
Average miles operated	9,506	9,401
Freight revenue	$71,124,460	$75,710,299
Passenger revenue	35,647,534	33,551,889
Total operating revenue	123,276,921	126,194,360
Maint. of way and structures	61,936,162	16,011,358
Maint. of equipment	14,927,084	14,884,063
Conducting transportation	40,484,550	36,895,636
Total operating expenses	84,663,052	80,265,332
Taxes	3,950,140	2,896,501
Net revenue	34,663,729	43,032,527
Gross income	38,673,209	47,218,111
*Net income	19,893,473	27,698,593
Dividends	17,112,700	13,157,013
†Surplus	2,761,746	14,408,585

*After the deduction of $282,952 for additions and betterments and $585,455 for reserve for depreciation of rolling stock in the 1908 year, and $603,972 and $609,251 for these accounts respectively in the 1907 year.

†After the deduction of $19,027 appropriated for surveys, etc., in the 1908 year, and $122,995 appropriated for losses in the San Francisco fire and for surveys in the 1907 year.

NEW PUBLICATIONS.

Why Freight is Lost or Damaged. By A. C. Kenly; printed under the auspices of the General Managers' Association of the Southeast by the Baughman Stationery Co., Richmond, Va. 32 pages; 6 x 9 in.; paper; fully illustrated.

This pamphlet is a concise and valuable exposition of the way certain kinds of goods ought and ought not to be packed, and is illustrated freely to that end. Some roads have placed orders for large blocks of the pamphlet for distribution among shippers, and we are inclined to think that it will do good. The cost of the pamphlet is not stated, but it is doubtless very small.

Letters to the Editor.

HIGH POWER MILLING MACHINES AND CUTTERS.

Rochester, N. Y., February 2, 1909.

To the Editor of the Railroad Age Gazette:

Your article on page 197 of the January 29 issue treats upon a very interesting phase of the progress recently made in shop practice.

The fact, however, that we now have at our command appliances for rapidly removing metal from forgings and castings has led in many cases to a lack of care and economy in the design of work requiring machine finish and the idea of bringing the amount of metal to be removed down to a minimum has largely been lost sight of. This feature is well worthy of the attention of engineers engaged upon mechanical design and I believe an article or articles upon this subject by some of your correspondents who are in touch with railway shops would prove interesting and instructive.

H. C. WHITE.

WANTED: A DIPLOMATIC CORPS.

Chicago, February 3, 1909.

To the Editor of the Railroad Age Gazette:

I think every right-minded railway manager does what you say W. J. Harahan was in the habit of doing. We have certainly taken newspaper comments as tips and investigated abuses before they became too irritating to the public for a number of years. Perhaps a specialist would do this better than the general operating staff, and I think your suggestion extremely valuable and opportune. A sermon that I think you cannot preach too often is one that has been preached in the *Railroad Age Gazette* before, and that is the necessity of settling claims promptly. The entire theory of settling claims, it seems to me, ought to be reversed. Many of them are fair and railways should seek means to pay them rather than delay them. In the past, the latter has unquestionably been almost standard practice. I am of the opinion if the centralization of claim payments were broken up, it would do much to remove this probably greatest cause of friction with the public. I do not see why under proper supervision division officers should not settle claims. They are the officers of the road who come in daily contact with the people making the complaints and claims, and they are best able to effect settlements. I am convinced that an overwhelming majority of claims could be successfully paid by division officers, and settlements could probably be made by a man in close touch with the public better than they can be made by a clerk in the general office hundreds or even thousands of miles away.

VICE-PRESIDENT.

CAR MOVEMENT AND ABSENCE OF MOVEMENT.

San Francisco, Cal., January 22, 1909.

To the Editor of the Railroad Age Gazette:

I have read with much interest the communication from Roy M. Baker published in your issue of January 8, entitled "A Car Record Criticism."

In speaking of the attention that is given to the *movement* of cars, and the lack of supervision bestowed upon them after they reach destination, Mr. Baker says, "from this it appears that the object is to get the car standing still just as quickly and safely as possible." While this is putting it somewhat bluntly, yet there are many who will be inclined to agree with this view of the matter.

The remedy which Mr. Baker proposes for the present condition of this is, however, not so readily understood. The essence of it appears to be the multiplying of records, or, as he puts it, "making two records grow where only one grew before." He then proceeds to outline a plan which, as I understand it, requires *three* records to grow where but one grew before. He would have the general office records kept in such a way as to show movements between divisions only. He would then have each division of a system keep a separate record of each car, sending copy to succeeding division. He would intrust a car to the division superintendent and "simply ask that he use it, keep a record of what it does, and return it promptly." Return it to whom? His plan appears to contemplate including only cars engaged in through service. What would happen in the case of a car engaged in local service on a division having anywhere from 500 to 1,000 miles of track, on which a car might remain continuously in such service for several months, or indefinitely? Would the general office be left without any record of such car until it moved to another division? It is very true, as Mr. Baker says, that the present method of recording the movement of cars serves only to show what they have done in the past; but I do not see that the scheme he proposes would have any other result. The movement of a car cannot possibly be recorded until after it has taken place.

The card system which Mr. Baker proposes is not new. It has been experimented with quite fully, and there are various modifications of this system, all intended to accelerate the movement of cars, or "get them standing still," as Mr. Baker puts it.

If, as he says, "the less a car stands still the more revenue it will earn," then it is obvious that the crying need is for something that will set it in motion again after it has reached its first destination. Instead of attempting to multiply records, would it not be more to the purpose to look closely after the current movement of the car itself—not through the medium of records or correspondence, but by actual personal supervision?

At present large numbers of men are employed throughout the country by car service associations to look after and figure out the amount of free time that is allowed shippers for use of cars. Instead of this why not employ an equal number of men to look after the prompt loading and unloading of cars, and cease for the most part according to shippers the free use of cars?

There can be no doubt about the importance of the car department of a railway, as Mr. Baker says, when properly viewed; and I think any observant reader of current railway literature will admit that of late there is a disposition to bestow upon this department a degree of attention somewhat commensurate with its importance. Surely the subject is worthy of all the study that is being given it, and a great deal more. The cars of a railway are the principal means—the tools so to speak—with which the vast earnings of the lines are made; and yet their owners apparently are content to have them handled with a degree of carelessness that would never be permitted in the case of equipment of equal value required in any any other line of business. It is well known, and will be admitted by all who have had anything to do with them, that car reports are for the most part inaccurate and unreliable, and that there are many cars of any railway from day to day that are not reported at all to the proper officer. There would appear to be no good reason why anything representing as much value as a railway car should not be accurately accounted for and its precise location known at all times; but it is equally clear from past experience that to accomplish this requires something more than the present style of records and reports. What is wanted is more personal supervision by those having authority to direct the movement and use of cars and put a stop to their misuse.

While the railways of the country are annually brought face to face with serious shortage of cars, and are expending vast sums to add to their equipment; while various measures are being proposed as a relief from present conditions, including "reciprocal demurrage" and other like regulations, it is the universal practice to allow shippers the free use of cars as warehouses to an extent that seems entirely unreasonable when

viewed from an independent standpoint. A shipper orders a car, and is allowed 48 hours in which to complete loading. The car may then be moved perhaps not more than ten miles, consuming about one hour's time, when it is again placed at the disposal of consignee, who is allowed 48 hours more in which to unload ("after first 7 a. m."); or he may retain the car under load indefinitely upon payment of $1 per day for the privilege. The owners of the car thus get one hour's use of it out of five days. While this may be an extreme case it is not by any means wholly imaginary. There are plenty of such instances. It has been computed that the average time consumed in loading and unloading freight cars throughout the country is nine days. This results in an absurdly low rate of mileage per car per day made by the freight equipment of the railways as a whole—about 24 miles per day.

How did railways fall into this apparently wasteful practice, and why can they not apply the remedy for car shortage by abandoning the custom of allowing shippers to use cars as warehouses upon payment of a nominal charge? Would the present practice with respect to freight cars be tolerated in connection with any other similar kind of business? Suppose a drayman were to drive up to a business house with a load of merchandise, and the head of the firm were to say to him: "Just unhitch your team and leave the dray here; we will unload it in a couple of days; or if we do not we will pay you $1 per day for the use of it thereafter." Fancy what would happen if a car-load of passengers, on arrival at their journey's end, should decide to remain in the car for a day or two, or until it suited their convenience to vacate it. Is there any difference between the principle involved in such cases and that underlying the demand for free use of freight cars?

Naturally the aforesaid drayman would protest against being required to give free use of his vehicle to accommodate the owner of the load. Would it be a sufficient answer to advise him to invest in some more drays? Hardly; yet this would be the equivalent of what the public expects of the railways; and the latter have attempted to comply with the demand to such an extent that to-day they find themselves with hundreds of thousands of idle cars on hand, costing many millions of dollars, which cars are required for only a brief period during the year—see reports of Committee on Car Efficiency of the American Railway Association.

There are not lacking shippers who are broad and fair-minded enough to admit that the principal cause of car shortage is the unreasonable extent to which the public makes free use of cars; and some of them are frank to the point of bluntness when expressing their views of this question. I know of one recent well-authenticated case where a shipper, in talking with the Manager of a Car Service Association respecting it, said: "The railway people are d——d fools"; and it probably would not be difficult to find others who hold the same opinion, minus perhaps the adjective.

So far as I am able to learn there is no obligation on the part of carriers to give free use of their equipment for storage purposes. The practice is entirely voluntary on their part. I fully realize that no one road, or one set of roads, could undertake to abolish the present practice; the move must necessarily be universal; but I am confident the remedy for car shortage lies in this direction. If it is not considered wise to wnolly deprive shippers of free time, then by all means let us reduce the present allowance one-half. Even this would be equivalent to providing an enormous addition to the car equipment of the country, with no outlay whatever for new cars for some years to come, provided the charge for detention beyond the limit of free time be made sufficiently high to effect the release of cars.

If the foregoing should attract the attention of any of your readers, or call out a reply, I am quite prepared to hear that as a condition precedent to the suggested reforms there must be a change in train service, more regularity in movement of freight, more advance notice to consignees, more warehouse room, etc., etc.—in short, all sorts of objections; nay more—I will endeavor to summon enough fortitude to withstand the shock even though some one shall say that this communication is sufficient to rank me among that type of railway men referred to by the certain shipper whose remark is quoted above. But the objections can be met, and the additional facilities provided at far less outlay than the millions of dollars annually spent for new freight cars to be used without recompense to their owners.

WOOLLY WEST.

OPERATING ORGANIZATION ON THE CANADIAN PACIFIC.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

The outcome of the new system of organization about to be inaugurated on the Union Pacific will be watched with considerable interest by operating officers who have felt for some time that an improvement in divisional administration was needed. There are some objections that will occur on reading the plan of the organization contemplated, but as it is much easier to criticize than to create, it is better that criticism be withheld until the new system has had a fair trial.

On Western Lines of the Canadian Pacific Railway a system is being introduced on several superintendents' districts, which is likely to be extended over the system. The Canadian Pacific is organized on the divisional plan. On Western Lines there are three general superintendents, each having a number of superintendents of districts reporting to them. The district organization consists of superintendent, resident engineer, trainmaster, district master mechanic, master of bridges and buildings, roadmaster for each section, and chief train despatcher.

The present staff of superintendents and general superintendents have been recruited from the ranks of civil engineers, clerks, telegraphers, trainmen, enginemen, and yard men.

A superintendent on a district is in general charge of maintenance and operation. The resident engineers, trainmasters, district master mechanics, roadmasters, etc., are required to take an interest in all branches, and though not expected to give orders outside of the special department they are in charge of unless in emergencies, are required to advise the superintendent and their fellow officers of matters coming under their notice, affecting the service generally. They are all required to make efficiency tests.

The average mileage of superintendents' districts is 475 miles. All the officers of a district are required to spend most of their time on the road, as that is felt to be the only way to produce the best results.

Under the scheme being inaugurated at district headquarters the offices will be divided as follows: One for the superintendent, one for the district master mechanic and trainmaster, jointly, a joint office for the master of bridges and buildings and roadmasters. The chief despatcher has a desk with the despatchers, and the resident engineer in his drafting office. Across the hall from these offices is a large room in which all the clerical work for the district is handled. In one end of the room is located the chief clerk, stenographers, file clerk and clerk in charge of requisitions, etc. In the other end the accountant, timekeepers and statistical clerk, the staff in this office being regulated according to the size of the district and the density of the traffic handled. All correspondence (unless marked personal) is opened in the clerical office. The routine letters are dictated by the chief clerk and placed for signature before the officer controlling that branch of the service, or in the officer's absense, signs them himself. Other than routine letters the chief clerk shows to the various officers concerned, who either dictate replies themselves, or indicate to the chief clerk how they should be dictated.

For example, a letter might be received from the general offices by the superintendent, requiring certain data, which

could only be supplied by a section foreman. The ordinary method would be for the superintendent to dictate a letter to the roadmaster, who in turn would send one to the section foreman, the replies following the same channel back. Under the new system, on receipt of the letter from headquarters the chief clerk would dictate a letter direct to the section foreman, signing the roadmaster's name, and on receipt of reply from the section foreman, would dictate a reply to the head office, signing the superintendent's name. The file would be complete, and two letters would take the place of five. This may be considered possibly an extreme case, but if the work of the different district officers be looked into, it will be found that in spite of all that can be done, more or less red tape is allowed to creep in, and useless correspondence indulged in.

This proposed system reduces expenses of clerical staff, stationery, etc., brings the officers closer together, and as it will minimize the office work, will afford the officers more opportunity to be out on the line. The end in view was, while improving the service, reducing red tape, and cutting down expense, nothing will be taken away from the individuality and standing of the various officers.

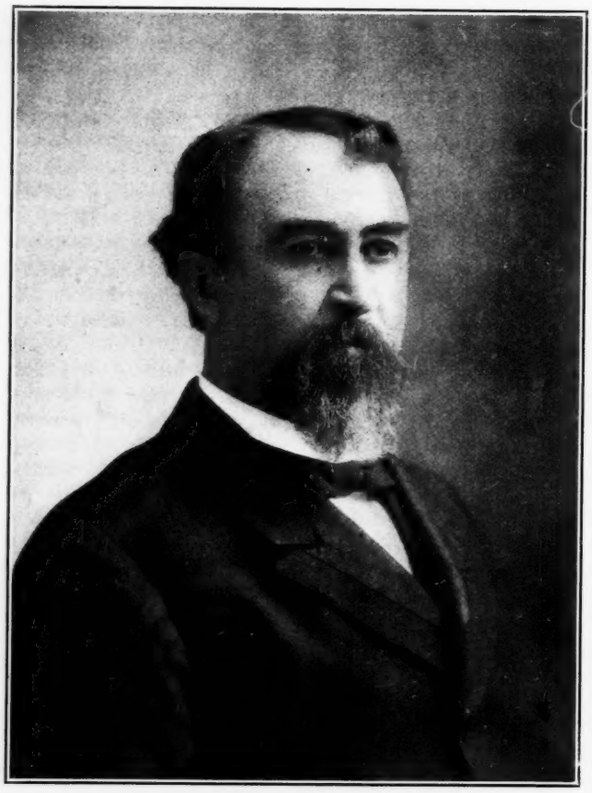
It will be interesting to watch the working out of the two systems.

SIMPLIFICATION.

THOMAS LOWRY.

Thomas Lowry, president of the Minneapolis, St. Paul & Sault Ste. Marie and of the Twin City Rapid Transit Company, died at his home in Minneapolis, Minn., on February 4.

Mr. Low y was one of the men who made possible the development of the Northwest by providing it adequate transportation facilities when it was much more uncertain than it is now whether investments in the city traction lines and steam railways would pay. He ranked among the leaders of transportation and finance of the West and was a figure of no mean importance in the country at large and in Wall street.



Thomas Lowry.

But it is notable that the men and the newspapers that have paid tribute to him have dwelt more on Lowry, the man, than on Lowry, the business man. Genial, witty, warm-hearted, generous and democratic without ostentation, he was one of the most lovable natures among the prominent business and railway men of the country. The Minneapolis *Tribune* of February 4 published a page of eulogies by his intimate friends in Minneapolis and elsewhere, and it is significant that repeatedly in these tributes he is compared, because of his tall figure, his homely humor, and his gentle and generous character, combined with great ability, to Abraham Lincoln.

It is related that when Mr. Lowry first went to Minneapolis in 1867 he wore a worsted suit, worn threadbare, an old-fashioned, high plug hat, and carried a carpet bag. He first stopped at a boarding house kept by a widow. At the end of a week he walked in with his carpet-bag and said to his landlady: "I have come to say 'good-bye.'" She asked why he was leaving. He replied: "I cannot stand $8 a week." It is said that when he arrived in Minneapolis to begin building his fortune he had only $7 in cash as a foundation for it.

In later years when the working men of Minneapolis decided to try to build a "Labor Temple" Mr. Lowry contributed generously toward the project. The promoters were not able to get as much money as they expected and the building committee again called on him and told the state of affairs. He gave his secretary a slip of paper and the latter soon returned with a check for $1,000. Mr. Lowry handed the check to one of the committeemen, saying: "Boys, I wish you the greatest success in your undertaking, and if you have any more trouble come back to me and I will give you another boost." Someone remarked: "Mr. Lowry, you are a pretty good Samaritan." "O, no," he replied, "We are all here to help one another and I am only thankful that I can do my share."

This incident was indicative not only of the prosperity Mr. Lowry had achieved, but was also characteristic of the man from the time that he got his fortune firmly established. No legitimate enterprise in the Twin Cities sought his aid in vain.

While Mr. Lowry's kindliness and generosity stood out in the minds of many of his acquaintances as his most marked characteristics, one of his friends says that the two traits that impressed him most were the man's powers of persuasion and his memory for names and faces.

His persuasiveness undoubtedly was one of the elements in his success. It was of course a great aid to his success as a lawyer; and it was subsequently a factor in his success as a financier. He got capital in many cases where a man with an equally good case but with fewer gifts of speech would have failed. As for his memory for faces and names, his friends say that, judged by the number of people he knew and remembered, he must have had more acquaintances than any other man in the United States. He was fond of calling his friends and employees by their given names, and this tended to augment his popularity with all grades of the service on his railway and traction lines.

Mr. Lowry was born in Logan county, Illinois, on February 27, 1843. His early years were spent in hard work on a farm. After getting a common school education he entered Lombard University at Galesburg, Ill., but ill health forced him to leave before graduating. After spending a year in the country bordering the Missouri river, he began the study of law at Rushville, Ill. Immediately after his admission to the bar in 1867 he went to Minneapolis. He foresaw perhaps more clearly than any other man the future of the city and gradually withdrew from the practice of law and invested his savings in real estate. He rapidly became one of the largest owners and dealers in real estate in the city. He also represented large investments in real estate that he had made for eastern capitalists whose confidence in the future of the city he had won. At the time of the panic, in 1873, it was believed by Mr. Lowry's friends that he was ruined, but they underestimated his resources. He came through the panic with his fortune more firmly established than before.

About this time some citizens organized a puny street rail-

way company. Mr. Lowry, being a large owner of suburban real estate, was keenly interested in this project and soon became one of the largest holders of its stock and finally its dominant factor, representing not only his own holdings but those of eastern investors. He became president of the Minneapolis street railway company in 1876 and ten years later was chiefly instrumental in consolidating the street railway lines in Minneapolis and St. Paul in the Twin City Rapid Transit Company, of which he became president. Under his management this company became one of the best traction companies in the country, both in point of the service rendered to the public, and of financial strength. It was one of the pioneers in the adoption of electric traction, and it has been a pioneer among street railways in the fullness, cleanness and honesty of its annual reports to stockholders.

Mr. Lowry became a director in the Minneapolis, Sault Ste. Marie & Atlantic in 1886. In 1888 this road, the Minneapolis & St. Croix, the Minneapolis & Pacific and the Aberdeen, Bismarck & Northwestern were consolidated as the Minneapolis, St. Paul & Sault Ste. Marie, and the next year Mr. Lowry was elected president of the consolidated property. He resigned in 1890, but was elected president again in 1891, and continued to hold that office until his death. In 1890 the road had a mileage of 788 miles. At the time of his death it was operating 2,340 miles. Meantime it had been reconstructed into a first class property physically, and its shares from a merely nominal value had risen in the market until preferred sold normally for over 150 and common for more than 140. By the recent purchase of the control of the Wisconsin Central the road became one of the most important trunk lines in the Northwest, reaching the Twin Cities, Sault Ste. Marie, Duluth, Winnipeg and Chicago, and constituting a very important part of the system of the Canadian Pacific, by which it is controlled.

The practical operation of the Soo, it is believed, was left chiefly to Mr. Lowry's very competent officers, E. Pennington, vice-president and general manager, and W. L. Martin, second vice-president and traffic manager; but it was Mr. Lowry's foresight and enterprise as a typical business man of the Northwest, and his great ability as a financier, that made possible and gave direction to the work of those under him.

ANNUAL REPORT OF BUREAU OF EXPLOSIVES.

Secretary W. F. Allen, 24 Park Place, New York City, has issued the annual report of the Chief Inspector of the Bureau for the Safe Transportation of Explosives and Other Dangerous Articles—the bureau maintained by the principal railways for the purposes named in the title. As our readers are aware, this bureau was established in 1907 by the action of prominent members of the American Railway Association. The president of the bureau is Dr. C. B. Dudley, chemist of the Pennsylvania Railroad, Altoona, Pa. The other roads represented on the executive committee are: The Erie, the Reading, the Norfolk & Western, the New York Central, the Illinois Central, the Missouri Pacific, the Union Pacific, and the Grand Trunk.

The number of roads in the bureau is 158, operating 202,186 miles. During the calendar year the 22 inspectors and agents of the bureau made 7,413 inspections of factories, magazines and stations where explosives are handled, and about 1,000 inspections of stations where inflammable articles (not explosives) are handled. *Four thousand eight hundred and fifty-two* boxes of high explosives were condemned as unsafe for transportation. These were found in 197 shipments. The losses of lives and property by explosions and by accidents in transporting explosives by rail were very much less in 1908 than in 1907. The laboratory maintained by the bureau has examined 778 samples of explosives and inflammables and has made reports on 542. Some of the examinations have brought out information which resulted in improvement in the manufacture of the article tested. A half dozen pages of the report are taken up with accounts of accidents, with a statement of the causes, so far as they could be ascertained. Appendix A gives the report of the chemist, C. P. Beistle, filling ten pages; and another appendix tells of the large number of addresses and lectures given to railway men and others by Chief Inspector Dunn and Special Agent Taylor. Special Agent Conreye and the local inspectors have also given many addresses.

The report contains full reprints of addresses given by Colonel Dunn and of the instructions to the local inspectors. These have been noticed heretofore in the columns of the *Railroad Age Gazette.*

TEMPERANCE IN PRUSSIA.

Some three years ago the Prussian Railway Minister issued orders forbidding large classes of employees, chiefly those engaged in train and switching and signal service, to take any alcoholic stimulant while on duty, or while waiting to go on duty.. A newspaper devoted to the interests of the employees sums up the results as follows: Without doubt, the men have gone to their work fresher and more capable, and have done their work more calmly, thoughtfully and willingly to the advantage of their own health and safety. Discipline has been better; resistance to superiors and quarrels among equals have decreased. There have been fewer cases of illness attributable to alcoholic excesses, and the younger employees especially have a realizing sense of their dangers. There has been no decrease in the number of employees punished for drunkenness, but this has been due to the fact that such cases are much more strictly dealt with.

RECIPROCAL DEMURRAGE.*

BY ARTHUR HALE.
Chairman of the Committee on Car Efficiency of the American Railway Association.

I have come here to ask you not to pass any of the bills you are considering covering what is called reciprocal demurrage.

The railways of this country are having a pretty hard time nowadays. They have had a hard time since the panic well over a year ago, and it looks as if the hard times would continue, at least till next fall. There has been a great deal of criticism of the railways in the nation and in this state; a great deal has been said against the railways that we railway men don't understand; but granting that it is all so, haven't we taken our medicine like men, and is this the time to give us another dose?

I am not going to burden you with figures showing the financial condition of the railways. I am a transportation man and I don't know too much about finances. I only want to call your attention to these statements and diagrams showing the surplus cars—the idle cars in the country, and I am sure you will agree with me that the railways have suffered enough.

You see there are over 300,000 cars idle, in addition to the cars in shops. That is about 15 per cent. of the whole.

You will find on that diagram a record of the car situation in this country since January, 1907; since the middle of the great car shortage of 1906 and 1907.

I understand that great car shortage began the agitation which led up to the introduction of these bills. It also led to the reports which show us what the car surplus is. During that car shortage the American Railway Association appointed the Committee on Car Efficiency, and the first duty of that committee was to ascertain what the shortage was and where it was.

There had been a great deal of talk about the car shortage

*Address before the Railroad Committees of the Nebraska Legislature, February 3, 1909.

before that, and each railway knew the situation on its own line, but no one knew what the total shortage was until January 2, 1907.

It was over 100,000 cars on that day, a very serious shortage. It increased to over 150,000 cars in February. It was reduced in the summer and then increased again till October, 1907, and then the panic came.

And since the panic there has been no shortage worthy the name. Our troubles have all been the other way.

The surplus was over 400,000 last spring, and with the shop cars the cars that needed repairs, nearly one-third of the equipment of the country was idle. It is not so bad now, but we have about the same surplus as the one that scared us so last winter.

I do not want you to think the only thing the railways did during the shortage was to get figures together. On the contrary, they exerted themselves in every way to increase their facilities and to use what they had to the best advantage. In especial they ordered cars, hundreds of thousands of them. Every car shop in the country was running full. The railways were paying the highest prices for cars and borrowing money to pay for them at the highest rates. And what is the result? Three hundred thousand idle cars.

The last 300,000 cars the railways bought cost $300,000,000—the other facilities that came with them, engines, tracks and the like cost as much again. There is over half a billion dollars of useless expenditure by the railways incurred solely to postpone car shortage. With this showing I cannot believe that you will add another burden to what the railways are carrying already.

For this reciprocal demurrage proposition would be a burden to the railways. It is reciprocal only in name. It does not give the railways one right or privilege that they do not already possess, which the courts have not confirmed to them again and again. On the other hand, it allows the shipper to collect of the railways certain fines in addition to any damage he may receive. I need not tell you, gentlemen, that whenever a railway actually damages a shipper by an unreasonable failure to supply cars or move cars, the shipper can collect damages. These bills give the shipper a dollar or so per car per day extra whether he is damaged or not. And they call them reciprocal.

The necessity of some sort of car demurrage is now admitted by almost every one. The last car shortage would have been much worse if there had been no demurrage rules anywhere, and it would have been somewhat relieved if the demurrage rules had been more widely applicable. During the worst of the shortage there were thousands of cars of export freight standing at our ports because there was no demurrage on them. The congestion was worst at Galveston. It was so bad there that the railways there have now succeeded in covering export freight with their demurrage rules and there will never be that trouble there again. But there are many other points that should be covered.

The whole demurrage question is a serious one. The railways are trying to get together on it, and the government bodies are taking it up. The National Association of Railroad Commissioners has appointed a very able committee to consider the question. Mr. Lane, of the Interstate Commission, is chairman and your Mr. Clarke represents Nebraska. It is hoped that this committee will do much to bring the laws on this subject into line.

For it is essential that if there are to be state laws on the subject they should be uniform. They cannot, of course, touch interstate business, but even on state business it would be unfortunate if, for instance, Iowa should give the man in Council Bluffs privileges which Nebraska does not give in Omaha.

And this is not the only chance for discrimination offered in the bill. The bill gives the railway the right to pay a shipper a dollar a car a day whenever it likes. Let the favored shipper only ask for more cars than he wants or let him ship ahead of time so that the railway can delay the cars a little, and what can stop such a legalized rebate?

Recent legislation has done a good many things *to* the railways, but it has done one thing *for* the railways and the honest shipper alike. It has wiped out rebating. Don't, gentlemen, I urge you, pass a bill that will bring the rebate back.

I hesitate before speaking of the future. A year ago I spoke on a similar occasion to a committee of the Massachusetts Legislature, and I told them that I hoped good times would come back in the fall. I need not say that they did not, but with all that, I cannot help feeling that good times must come again this fall. I want to see, and you want to see times that will start every industry and will put in use every one of our idle cars and more. I believe such good times are coming and I want the railways ready for them. The railways are standing still now—they don't know what to expect, they want to buy cars, they want to extend their lines, but they don't dare to. I think they ought to extend their lines. A study of the map of Nebraska shows that many railway lines ought to be extended if this state is to develop. You want those lines built, you want the railways to pluck up courage and prepare for the development that is sure to come. Why consider bills like this when you can join to help the railways to bring back good times?

TRAIN ACCIDENTS IN DECEMBER.[1]

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of December, 1908. The monthly records are intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. They are based on accounts published in local daily newspapers, except in the cases of accidents of such magnitude that it seems proper to write to the railway manager for details or for information:

Train Accidents in the United States in December, 1908.

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of Train.	No. persons reported Kil'd.	Inj'd.
†6.	G., C. & S. F.	Haney.	bc.	P. & P.	2	3
*22.	C. & A.-B. & O.	Chicago.	xc.	P. & P.	0	1
24.	Terminal	St. Louis.	rc.	P. & P.	1	6
25.	Gt. Northern	Elmira.	bc.	P. & Ft.	1	4
*28.	Gt. Northern	Mid Canon.	bc.	Ft. & Ft.	8	4

Derailments.

Date.	Road.	Place.	Cause of accident.	Kind of train.	No. persons reported Kil'd.	Inj'd.
4.	Rock Island	Keers, Ark.	d. switch.	Pass.	2	2
9.	Nor. Pacific.	McKenzie.	b. rail.	Pass.	0	11
24.	L. S. & M. S.	Pleasant Lake.	b. wheel.	Pass.	0	5
26.	G. C. & Piedmt.	Reidsville.	unx.	Pass.	0	12
27.	Southern	Lumber City.	d. switch.	Ft.	0	6
29.	Southern	Stokesland.	ms.	Pass.	1	2

Other Accidents.

4.	N. Y., O. & W.	Middletown.	boiler.	Ft.	0	1
12.	Sou. Pacific.	Beaumont.	boiler.	Ft.	3	1
24.	L. S. & M. S.	Laporte.	boiler.	Ft.	1	1

The trains in the butting collision at Mid-Canon, Mont., on the twenty-eighth, were a northbound freight and a work-train running south. The work-train consisted of an engine, pile driver and caboose, the caboose being in front and the engine at the rear. Six bridge carpenters in the caboose and a brakeman on the engine of the freight train were killed, and seven employees were slightly injured. The caboose immediately took fire and most of the wreck was burned up. The body of one of the men who were killed was destroyed in the fire. The collision was due to disregard of a "run-late" order by the northbound train. The order specified 1 hour 30

[1] Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, other collisions——b, Broken——d. Defective——unf, Unforeseen obstruction——unx, unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of boiler of locomotive on road——fire, Cars burned while running——P., or Pass., passenger train——F., or Ft., freight train (includes empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

minutes late, but the train was only 1 hour 10 minutes behind its time.

The train derailed at Stokesdale, Va., on the twenty-ninth was southbound fast mail train No. 35, and the engine, baggage car and two mail cars were overturned. The switch leading to the Danville & Western track had been left misplaced, but it would appear that the fact should have been discovered by the engineman, as, according to the best evidence, the signal light showed red. The derailment occurred at 5.50 p.m. The engineman was killed, and the fireman and one postal clerk were injured.

The train derailed at McKenzie, N. Dak., on the ninth is said to have been running at the rate of 50 miles an hour, and the cars were occupied by about 200 passengers, and yet the three day cars and three sleeping cars are said to have fallen down a bank without fatal results to any of the occupants. This fortunate result is attributed to the presence of a deep snow drift in which the cars lodged with so little shock that the couplings were not separated.

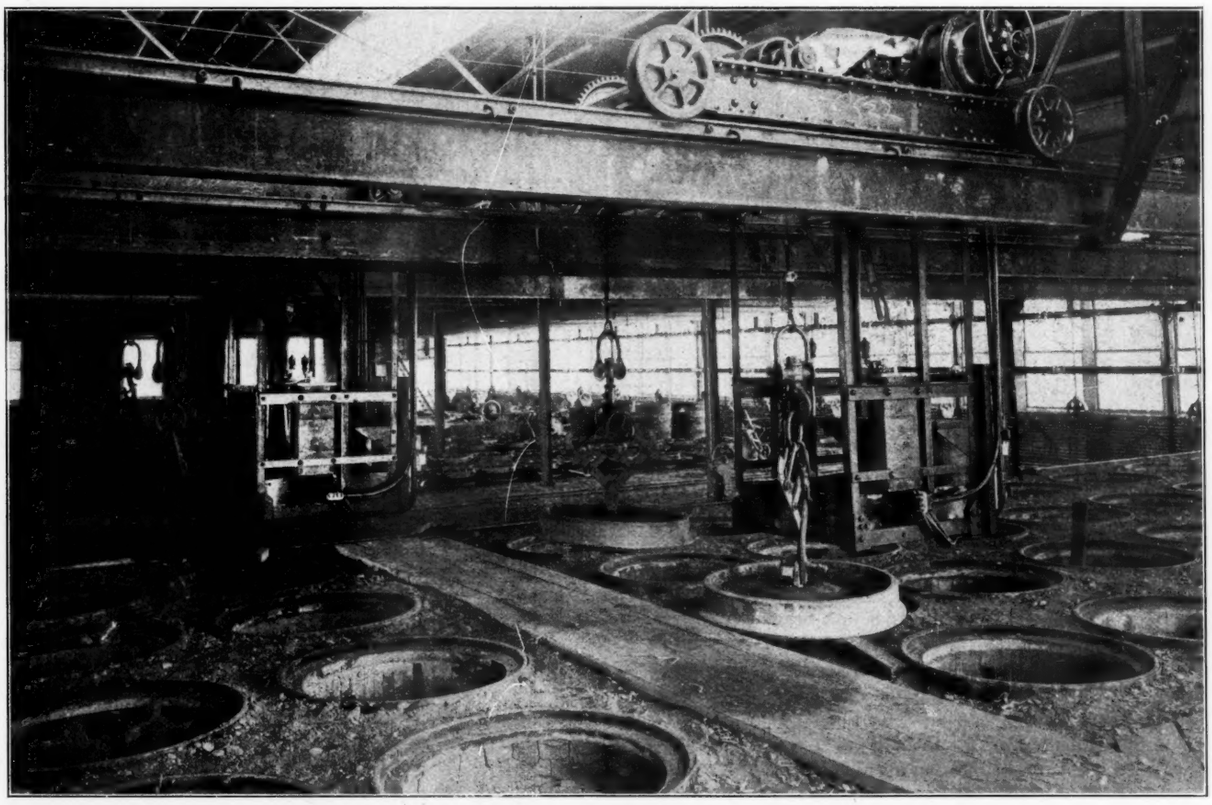
A blood curdling story of a wreck of 72 freight cars in a runaway at Addison, N. Y., on the twenty-fourth in which a factory and several passenger cars were said to have been destroyed by fire, is characterized by an officer of the road as a gross exaggeration. There was a runaway of freight cars, but the damage was moderate and no one was seriously hurt.

The only fatal electric car accident which we find in the newspapers in December was a butting collision at Worcester, Mass. One of the two motormen was killed and two other persons were badly injured.

The German Railway Union has changed its method of designating classes of locomotives. Heretofore an American locomotive, four drivers with 4-wheeled truck in front, was designated as follows: o o O O; and others in a corresponding way, truck wheels, or rather axles with truck wheels, by small circles and drivers by larger ones. With the increase of wheels, this becomes a long expression, not quickly written. By the new method, truck axles are designated by Arabic figures and driving axles coupled by capital Roman letters, A for one, B for two and so on. Thus an engine with 10 driving wheels coupled is designated simply by "E"; one with eight drivers coupled, a pony truck in front and a 4-wheeled truck behind by "1 D 2." In case driving axles are not all coupled, the numbers coupled are given separately. For instance, a Webb three-cylinder compound, with pony truck in front, the driving axles not being coupled, is designated by "1 A A." When there is more than one set of driving-axles coupled, each set is designated with "+" between them. Thus a Mallet locomotive with two sets of three driving-axles coupled is "C+C."

LOUISVILLE CAR WHEEL FOUNDRY.

The Louisville Car Wheel and Railway Supply Co. was organized in 1871. It had the first car wheel plant south of the Ohio river, although some wheels had been made in ordinary soft iron foundries with the usual equipment of such foundries. The plant was quite small and was enlarged in 1882 to a capacity of 100 wheels a day, which was stretched from time to time until the capacity reached 150 wheels per day, as it now stands. In 1907 they began the erection of a new plant, located some three miles from the old plant, and on the main line of the Louisville & Nashville.



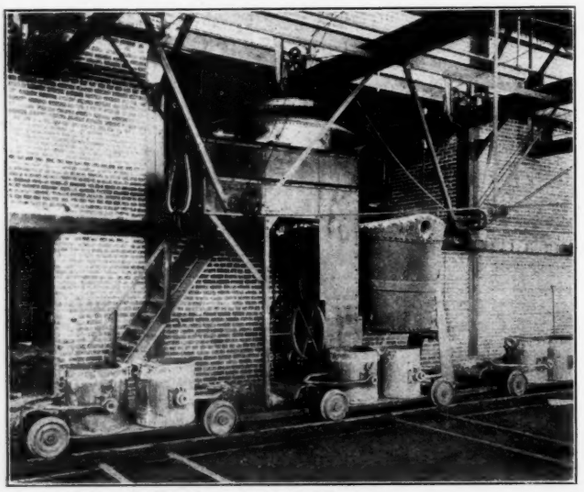
Annealing Pits Served by Electric Hoist.

The plant was designed and equipped by the Whiting Foundry Equipment Co., Harvey, Ill., with their straight line system, similar in detail to that supplied the Chicago, Milwaukee & St. Paul. The building is of brick and steel construction throughout. The main building is 200 ft. long and 120 ft. wide, with a side bay of 30 ft. x 60 ft., containing

cupola and blower rooms. It is equipped with 15 floors of 25 wheels per floor, making a total capacity of 375 per day.

The cupola is a No. 10 Whiting, 96 in. in diameter, and 52 ft. 6 in. high. It is lined to a diameter of 78 in. inside. This cupola will melt at a rate of 24 tons per hour. Located at the side of cupola is the blower or power room, equipped with a No. 12 Sturtevant positive blower and a Chicago Pneumatic Tool Co.'s air compressor with a capacity of 250 ft. of air per minute; both being driven with a 50 h.p., a.c. General Electric motor. The charging floor, 30 ft. x 60 ft., is served by two 3-ton Whiting Pneumatic elevators, fitted with 20-in. balanced air hoist. The floor is provided with four sets of tracks with a transfer car at each end, the idea being to provide for the storage of loaded cars before the heat; then to gradually work them off through the charging machine, and then down to the ground floor for fresh charges. In front of the cupola is placed a Whiting pneumatic charging machine.

This machine consists of a platform hinged at a level above the charging platform on the side toward the cupola, provided with a track for the charging car in line with stationary tracks as shown. It has guard angles and a hook for holding the car to the platform when being dumped. A dumping cylinder is properly supported by framing attached to the charging floor and pivoted to allow the alinement re-



View Showing Ladle Truck at Cupola.

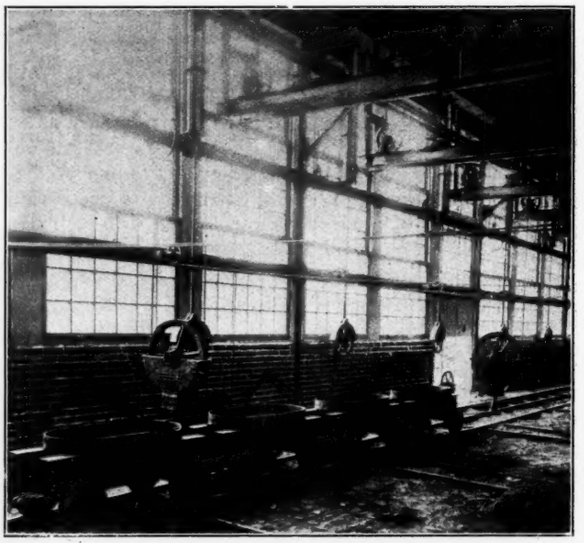
guired. The piston rod is pivoted in a bracket attacheed to the under side of the platform. The platform is built of structural shapes and all joints are strongly riveted. The hinge pins are of ample size and arranged for easy removal and replacement. An apron plate is hinged to the platform and laps over an inclined chute in front of the cupola door. The controlling valve is located at any convenient point and is piped to the cylinder and connected with air supply.

In operating, the car is run on the platform and the hook engaged with an eye attached to the car frame. Then the valve is opened to admit air into the operating cylinder and the platform is raised to the dumping position. Iron charges are put on cars with ends about 12 in. high, but open on both sides. Coke cars have their ends and sides enclosed, one side being fitted with a hinged door.

By manipulating the valve, the charge may be distributed as desired. The level of the charge must be maintained from 3 ft. to 4 ft. below the level of the door sill to get the best results.

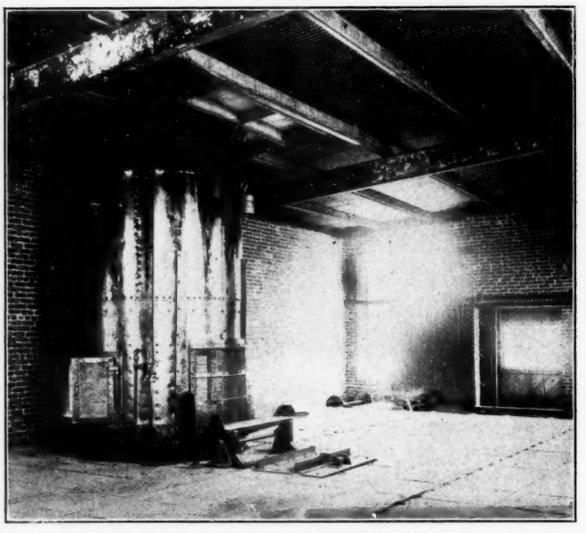
The floor cranes are equipped with a balanced air hoist. This type of hoist having air under pressure on both sides of piston makes it especially suitable for molding floors, its action closely resembling that of a hydraulic hoist. The valves for these hoists are attached to the structural work independent of the hoist and are of special heavy construction to withstand the heavy usage necessary for this work.

The core room and ovens are located in a separate building 30 ft. wide and 80 ft. long. There are two core ovens with space for a third. One oven is 9 ft. wide x 16 ft. long, without side racks, and the other 13 ft. wide x 16 ft. long, with side racks; both being 8 ft. high. They are fitted with



View Showing Pneumatic Hoists for Flasks.

counter-balanced sliding doors. Both are fired from a pit in the back. The heat from the fire-box being distributed by special arrangement of flues insures an equal distribution, the steam and gas escaping in stack from an opening located at the floor line. For firing up they are provided with a damper located at top of oven which opens to allow the escape of smoke and closed as soon as they obtain a clear fire. Each oven is provided with two lines of tracks, and



Pneumatic Charging Machine.

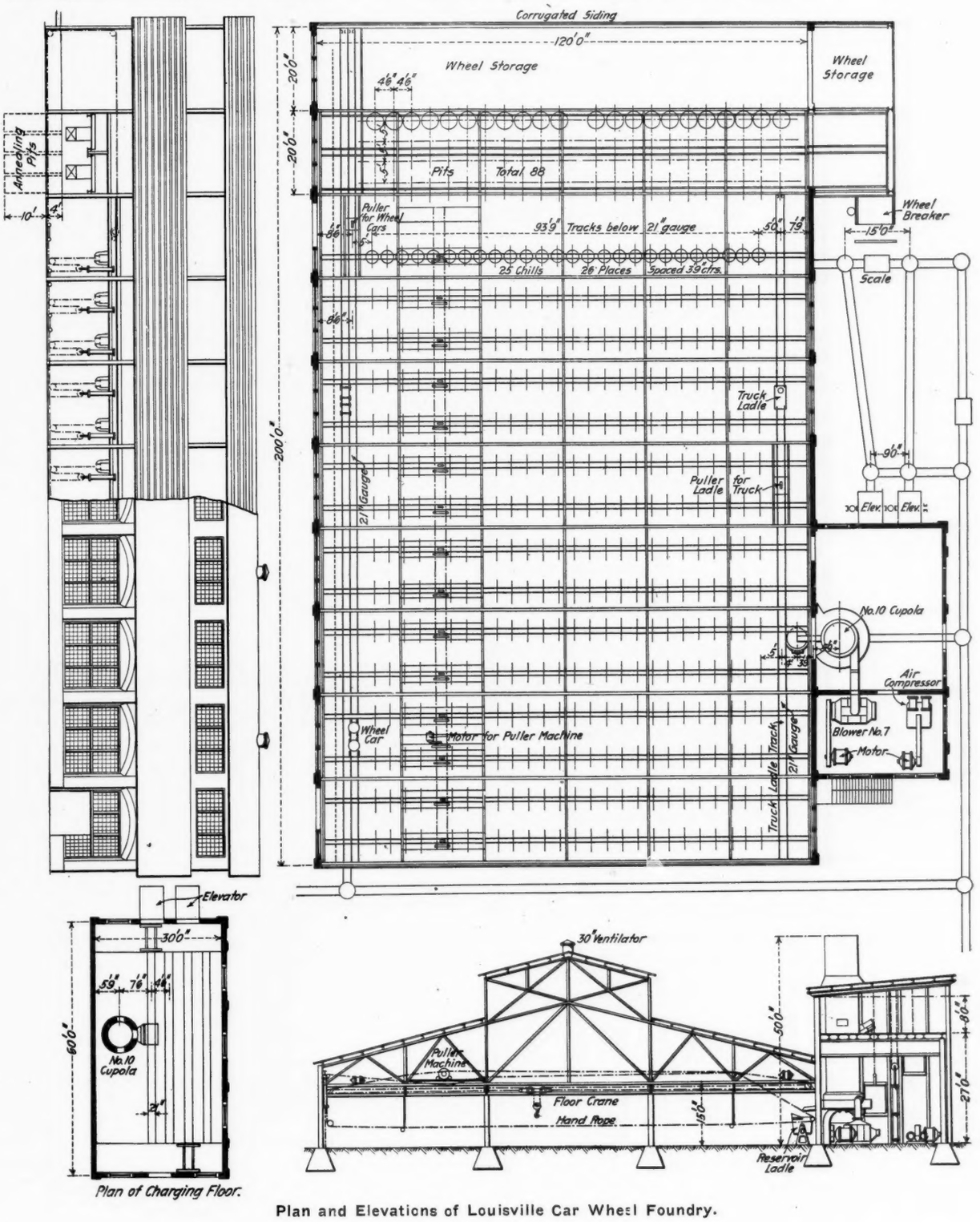
can accommodate 6 cars each. These cars are built of channels, angles and plates, and are 4 ft. x 4 ft. 6 in., with perforated plate shelves. This type of shelf makes it especially convenient for this class of work, making it easy for sliding on and off cores. In order to facilitate the handling of these cars, a transfer car is provided in front of the ovens. The annealing pits are served by two standard Whiting pitting

trolleys with built up structural frames, each trolley handling two wheels at once and thereby serving two rows of pits. They are each fitted with two 5-h.p., a.c. General Electric motors. They are also fitted with the Whiting semi-automatic pitting tongs.

The operator's platform, reservoir, ladle, the train distributing iron, the hot wheel train delivering wheels to annealing pits, are practically duplicates of equipment furnished the C. M. & St. P.

The 3-phase, a.c., motors were supplied by the General Electric Company. The motors are distributed as follows: Reservoir ladle, 5 h.p.; ladle trains, 5 h.p.; hot wheel train, 5 h.p.; pitting trolleys, two 5 h.p.; floor cranes, 15 h.p.; blower and compressor, 50 h.p. The power for this foundry is supplied by the Louisville Lighting Company. The structural steel work was constructed and erected by the Sneath Architectural Iron Works, Louisville, Ky.

The plant was designed and equipped by the Whiting Foundry Equipment Company, Harvey, Ill., which make a specialty of complete foundry plants.



Plan and Elevations of Louisville Car Wheel Foundry.

ELECTRIFICATION OF MELBOURNE SUBURBAN LINES.*

BY CHARLES H. MERZ, M.INST.C.E.

XIII.

An accompanying table gives leading particulars of the existing rolling stock which is run in the present suburban service. The total number of bogie coaches is 305, and the total number of fixed wheel-base coaches, 316.

Of this stock, neither the six nor four-wheeled stock with fixed wheel-base is at all suitable for the electric service, but such bogie stock as is constructed with all-steel underframes could be utilized, if it were not for its varying length which results in considerable variation both of weight and of seating accommodation.

Coaches of different lengths are very undesirable, especially for multiple-unit working, the essence of which is uniformity among the different sections making up the train, as regards capacity and interchangeability of motor equipment. Further, as already stated, the maximum accommodation per ton weight of coach is secured by the longest practicable coach; for your suburban lines and with ordinary compartment doors opening outwards, the limit of length is about 60 ft.

I have inspected the design and condition of this bogie stock in the sheds at Melbourne, and the chief mechanical engineer has handed me drawings showing in detail the construction (which is quite in line with the best current steam practice) and how it is proposed to lengthen the stock to the limiting dimension and, although certain alterations would be necessary in order to make the underframe suitable for carrying the electrical equipment with the clearances required, these are not calculated to increase the weight or to complicate the underframe to any appreciable extent.

As a result of the discussion on these matters, which took place while I was in Melbourne, complete estimates of cost were got out by the chief mechanical engineer for lengthening nearly all these coaches and for a corresponding strengthening of the underframes and trucks and also for the provision of driving compartments. These estimates, summarized in a table, show that the carrying out of these alterations would be a much cheaper matter than building entirely new stock.

If all the suitable bogie coaches given in the table of existing stock, and also the 10 new coaches,* were dealt with in this way, there would be a total of 305 coaches, each capable

Existing Suburban Rolling Stock.†

Type of stock.	Description.	No.	Length in ft.	Av. seating capacity.
Bogie	AA	155	45	61
	BB	29	45, 50	73
	ABab	21‡	44, 45, 50	66
	ADad	82	45, 50	52
	BDbd	18	50	70
Fixed wheel-base	A	36	30	32
	B	220	24, 25½, 27½, 30	47
	BH	12	25¾	50
	ABD	1	24	25
	BD	43	24, 26	26
	D	3	24	Van
	AB	1	30	50

*Ten coaches completed subsequent to the report of the electrification committee and treated as additional stock (see table of costs of new rolling stock, alterations, etc.).

†Excluding stock required for Frankston, St. Albans, Werribee and Eltham.

‡Ten ABab stock are not suitable for conversion.

of seating from 70 to 80 passengers, depending on whether motormen's and guards' compartments were required or not.

Since a total of 496 coaches of this size would be required for the proposed service, there is, for Stage III, a balance of 191 coaches to be provided, and these could all be of the new type referred to, or, if it be desired to provide corridor stock for all the country lines, there are 124 bogie coaches at present in use in this service which might be replaced by corridor stock and altered in the same way as the present suburban coaches for electric working, thus leaving only 67 new coaches to be provided. I assume that the latter course will be adopted and give in a table a summary of the cost of carrying out the alterations. The amount to be credited to the country service for the loss of this stock is included in another table under "Additional rolling stock."

In order that a high schedule speed may be maintained, the advantage gained by the quick acceleration of the electric trains must not be lost in long stops at stations, and the public should be induced to assist the operation of the railway by entering and leaving trains as quickly as possible. It is in connection with this station stop that the outward swinging side-door stock is at some disadvantage as it is essential that the doors should be closed before the train leaves the platform.

Cost of Lengthening and Altering Suburban Steam Stock.

No.	New class.	Cost.
2	Motor coach with 2 driving compartments	£981
2	" " " 2 " "	1,179
73	" " " 1 driving compartment.	33,393
85	" " " 1 " "	47,297
21	Trailer coach with 1 " "	9,516
9	" " " 1 " "	4,009
4	" " " 1 " "	2,144
60	" " without driving compartm't.	24,747
39	" " " " "	16,619
10*	" " " " "	2,447
305	Total	£142,332

* Completed subsequent to Report of Electrification Committee and treated as additional stock. See later table of "Cost of New Rolling Stock, etc."

The duty of closing the carriage doors, at present devolving on the station staff, will be rendered more difficult by the higher acceleration. With an acceleration of .9 miles per hour per second and the maximum length of train proposed, the speed at which the last door will pass a point at the end of a 360-ft. platform, would be 21 miles per hour—too high to contemplate the effectual closing of swing doors from the platform. It must be arranged, therefore, either to close the doors before the train starts, or if with the present staff, this

Cost of Lengthening and Altering Country Steam Stock.

No.	New class.	Cost.
45	Motor coach with 1 driving compartment	£25,039
20	Trailer " " 1 " "	10,721
58	" " without driving compartm't.	29,176
1	" " " " "	458
124	Total	£65,394

would mean increasing the stopping time required, to provide additional men at the more busy stations. This applies only at such times as six-coach trains are in service; on the majority of the branches this would be during the heavy morning and evening traffic only, and I recommend that such additional staff should be provided at such times and places.

Alternative ways of dealing with the matter are either to close the doors automatically or to convert them from outward swinging doors to sliding doors. Neither of these methods can, however, be recommended, the former on account of the complication, the latter on account of the cost.

I therefore recommend that if any electrification scheme be proceeded with, such of the existing stock as is suitable for the purpose be lengthened and altered for the electric service and that on routes where this is used additional staff be provided at the busier stations during rush hours of traffic and that new stock be provided to make up the required number of coaches. In order, however, that ample experience of the proposed new type of coach may be obtained before building it in large quantities, I consider sufficient coaches should be built to form two six-coach trains for Stage I of the conversion; this has been allowed for in the estimates.

The existing trucks, while they can conveniently be made suitable for use as trailer trucks, are not suitable for carrying the motors themselves. I, therefore, recommend that new motor trucks be built according to the design discussed in Melbourne, and the cost of these is included in the tables showing cost of lengthening and altering steam stock.

I have assumed that all the work in connection with the rolling stock for the electric service would be carried out in your own workshops. I have, however, fully allowed in the estimates for the cost of this work, basing my figures on the information prepared by your chief mechanical engineer.

(To be continued.)

*Abstract from the Report to the Victorian Railways Commissioners on the application of Electric Traction to the Melbourne Suburban Railway System. Published by the courtesy of the commissioners.

A NEW DEPARTURE IN FLEXIBLE STAYBOLTS.*

BY H. V. WILLE, M. A. S. M. E.

There is practically no literature on the subject of staybolts, and this is particularly true of flexible staybolts. The increasing size and pressure of boilers make this subject of vital importance to railways and to those responsible for the management of that type of boiler in which the firebox is stayed by a large number of bolts. The boiler of the consolidation locomotive, now the prevailing type in freight service, contains 1,000 bolts less than 8 in. long and about 300 of greater length. The large types of Mallet compound locomotives now

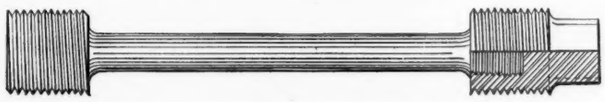


Fig. 1—Flexible Spring Steel Staybolt.

meeting with much favor have a much larger number, there being 1,250 short and 300 long bolts in locomotives recently constructed. In recent years some form of flexible staybolt, that is, one having a movable joint, has been very extensively used in the breaking zone of locomotive boilers, but their high cost and the difficulty of applying them, their rigidity from rust and scale, and the fact that their use throws an additional service on the adjacent bolts because of lost motion, has militated against their more general use.

It is well known that staybolts fail, not because of the tensional loads upon them, but from flexural stresses induced by the vibration resulting from the greater expansion of the firebox sheets than of the outside sheets, but notwithstanding the general acceptance of this theory, engineers have designed staybolts solely with respect to the tensional loads. It is quite general practice, it is true, to recess the bolts below the base of the thread, and this has effected a slight reduction in the fiber stress, but practically no effort has been made to design a bolt to meet the flexural stresses or even to calculate their

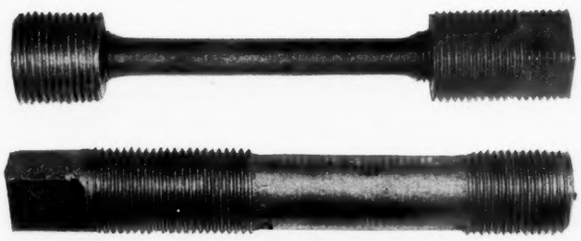


Fig. 2—Flexible Spring and Regular Iron Bolts of Same Tensile Strength.

magnitude. This is surprising in view of the simplicity of the calculations to which the ordinary formulae for flexure apply.

Let F = fiber stress. N = deflection.
E = modulus of elasticity. L = length.
I = moment of inertia. W = load.
D = diameter.

We then have

$$W = \frac{2\ F\ I}{D\ L} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$N = \frac{W\ L}{3\ E\ I} \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

substituting

$$N = \frac{2\ F\ L^2}{3\ E\ D} \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$F = \frac{3\ E\ D\ N}{2\ L^2}\dagger \quad \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

†Testing of Staybolt Iron. H. V. Wille, A. S. T. M., Vol. IV., 1904.

*From a paper to be presented before the American Society of Mechanical Engineers.

This formula shows that the stress increases in direct proportion to the diameter and decreases as the square of the distance between the sheets. The application of the formula to service conditions gives the following stresses:

Conditions: Bolt spacing, 4 in. centers.
Assumed expansion, 4/100 in.
Length of bolt, 6 in.

Type.	Diameter of Bolt.	Flexural Stress.
Iron	1⅛ in.	51,500
Iron	1 "	45,000
Iron	⅞ "	39,400
Spring steel	1-in. ends, ⅞-in. stem.	19,700

Iron is universally employed in the manufacture of these bolts and it is not good practice to exceed a fiber stress of 12,000 lb. per sq. in. It is apparent that staybolts in the zone which meets the expansion of the sheets are stressed above the elastic limit and must necessarily fail from fatigue. Fractures always originate at the outside sheet at the point where the bending moment due to the movement of the furnace sheets is greatest. The fractures are in detail, usually starting from the base of a thread and gradually extending inward.

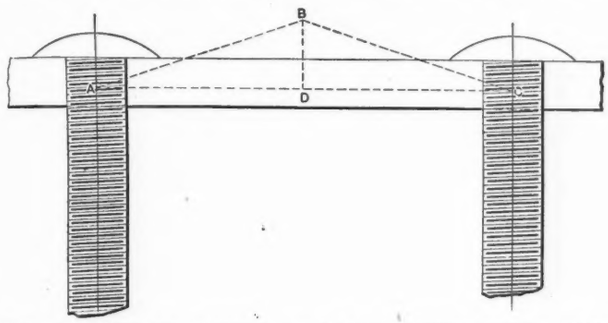


Fig. 3—Showing Manner in Which Plates Buckle With Rigid Stays.

Manufacturers of staybolt material have endeavored to minimize failures and to meet the unusual conditions of an iron stressed beyond its elastic limit by the supply of specially piled iron arranged with a view to breaking up the extension of the initial fracture. For this reason, iron piled with a central section of small bars and an envelop of flat plates has met with much success for this class of service. In a further effort to secure an iron specially adapted to this class of work various forms of shock, vibratory and fatigue tests have been imposed. No design has yet been produced, however, which permits the employment of material of elastic limit sufficiently high to resist the flexural stresses, although a large class of material particularly adapted to the purpose is available.

It is obvious that the remedy does not lie in the use of a slow-breaking material, but in the employment of material of sufficiently high elastic limit to meet the conditions of service. It is also possible to reduce the diameter of the bolt greatly by the use of such a material, thus proportionately reducing the fiber stress in flexure. Staybolt material, however, must possess sufficient ductility to enable the ends to be readily hammered over to make a steam-tight joint and to afford additional security against pulling through the sheets. To meet these conditions the bolt illustrated in Fig. 1 has been designed. The stem is of the same grade of steel as that used in the manufacture of springs. It is oil-tempered and will safely stand a fiber stress of 100,000 lbs. per sq. in. Its high elastic limit makes it possible to reduce the diameter to ⅝ or 7-16 in. or even less. The ends are of soft steel, and it is thus possible to apply and head up the bolt in the usual manner. The employment of a stem of the diameter indicated reduces the fiber stress in flexure to less than one-half that in the ordinary type of bolt and it is of material capable of being stressed to a high degree. It has hitherto been impossible to employ in staybolts any of the steels containing chromium, nickel, vanadium or other metaloid possessing properties especially

adapted to this class of work, but these steels can readily be used in the stem of the bolt described. The stem of the bolt can be flexibly secured to the end in one of the customary ways, but the flexibility of the bolt does not depend upon a flexible connection. A type of bolt with a relatively inflexible connection, usually one in which the stem screwed into the ends with a running fit, met with the most favorable consideration. Such a bolt is flexible as a spring is flexible, in that it can be deflected to meet the requirements of service without exceeding the elastic limit. In fact, the stem may be of a number of pieces, either of plates or small rods, thus increasing its flexibility.

The actual breaking strength of the bolt sizes ordinarily employed is shown in the following statement. These bolts were recessed to the base of the thread and tested in the same form as that in which they are employed in service. For comparison the approximate weights of the usual length of bolt are also given. These weights are for bolts over the entire length, including the squared ends for screwing the bolts into the sheets.

Type	Nominal Diameter	Actual Breaking	Weight	Vibrations
Iron	1 in.	32,500	20 oz.	6,000
Iron	⅞ "	24,500	15 "	5,200
Spring steel stem	1-in. ends, $\frac{7}{16}$-in. stem.	32,000	10 "	500,000

ACTUAL BREAKING STRENGTH OF STAYBOLTS.

The vibrating test was made by clamping one end of the bolt in a machine and revolving the other end through a radius of 3-32 in., the specimen being 6 in. long from the end of the right head to the center of the rotating head. A tensional load of 4,000 lbs. was also applied to the bolts. The best grades of iron bolts break on being subjected to from 5,000 to 6,000 rotations, whereas the spring steel bolts were vibrated 500,000 times without failure, and on some of them the test was continued without failure to 1,000,000 vibrations. These tests demonstrated that the bolt is not stressed beyond the elastic limit under these severe conditions and that the probability of its failure in less severe conditions is very remote.

The extent of the expansion which can take place in the firebox of a boiler can readily be calculated.

Distance between staybolts, 4 in.

Temperature of inside sheet, 400 deg. Fahr.

Temperature of outside sheet, 100 deg. Fahr.

Coefficient of expansion, 0.0000066.

Then the expansion between two bolts will equal: $0.0000066 \times (400 - 100) \times 4 = 0.0079$, and each bolt will deflect 0.00395 in. It has been shown that this amount of deflection will stress the usual type of bolt beyond the elastic limit. In practice, however, one bolt may hold rigidly, throwing the entire deflection on the adjacent bolt, or neither bolt may deflect and the sheet will then buckle. Under this condition the neutral axis will assume the form *ABC*, Fig. 3, and the length *AB* will equal 2.00395 in. and the sheet will buckle to an extent, $BD = \sqrt{2.00395^2 - 2^2} = 0.125$ in. It is obvious that the repetition of a force sufficient to buckle a sheet ⅛ in. must ultimately lead to a crack in the furnace sheets. If, however, the bolt deflects, allowing the sheet to normally expand, the latter will be relieved of these extraneous loads. A bolt of sufficient flexibility to deflect under the forces following expansion, and of material which will not be stressed beyond the elastic limit in resisting these forces, will greatly assist in reducing the cost of boiler maintenance by eliminating broken staybolts and reducing the stresses in the furnace plates. If in addition the bolt has a smaller diameter the life of the furnace plates should be further increased, as such a bolt will interpose less obstruction to the circulation of the water in the water legs.

TRACK CIRCUIT SIGNALS WITHOUT INSULATED JOINTS.

A few months ago, the Hall Signal Company, New York, announced a track circuit arrangement which does without insulated joints and which is applicable to electric railways without the use of reactance bonds; and now, the scheme having been in use on the Long Island road for six months or more, a description is issued. From this we make the following extracts:

With the advent of the electric locomotive the insulated joint became a difficult problem; for reasons of economy in installations of third rail systems, the running rails are used as conductors for the return of the propulsion current. With the standard track circuit with insulated joints it is necessary, if the running rails are to be thus used for the return power current, to supply reactance bonds to bridge the insulated joints.

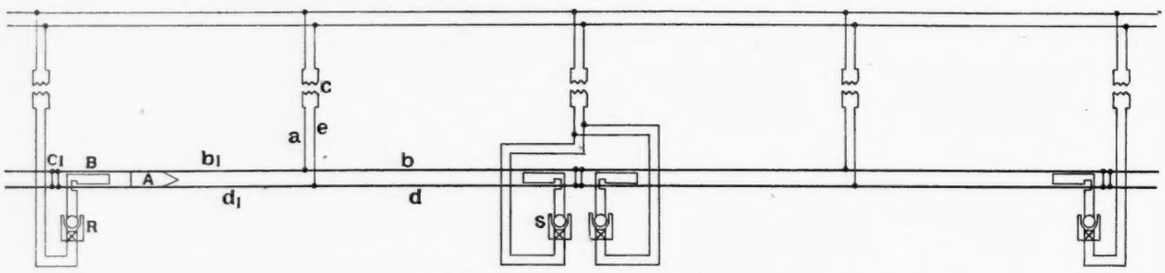


Fig. 1—Alternating Current Track Circuits—Long Island Railroad.

The system here described does not require the use of either insulating joints or reactance bonds. It was put in service on the Rockaway Beach Division of the Long Island Railroad in June, 1908, between Ramblersville and The Raunt station. On this line the electric trains are operated by the third rail system, with 500 volt D. C. current as the operating power. At the sub-stations an A. C. current is transformed from 6,600 volts, 25 cycles, to 2,200 volts A. C., 25 cycles, at which voltage it is carried through the different sections of the road where automatic signals are used, on two No. 2 bare copper wires, for the signal supply current. As the territory through which the new signals were installed is on a trestle over Jamaica Bay, it was considered objectionable to use a high voltage, and accordingly a step-down transformer of 3 K. W. capacity was placed in the signal supply line at the west end of the trestle, to reduce the voltage to 220, which is the voltage used for the signal supply for the new system. The blocks are approximately 2,700 feet in length, and home and distant signals are used as on other sections of the road.

At each signal location, a storage battery of five cells in duplicate of the Standard Electric Accumulator Company's battery, charged from the third rail through resistances, is used for the operation of the motors and slots. At one of the signal locations, however, the storage battery is not used, but in its place is substituted a rectifier of special design, which is connected to the A. C. supply through the regular relay transformer, which provides direct current at 12 volts for the operation of the motors and slot magnets at this location.

By the use of this rectifier, a direct current supply is provided from the same A. C. source as that used for the track

circuit, which allows the use of standard signal apparatus with D. C. motors and slot coils.

Figure 1 shows the arrangement for the operation of the track circuit. At each signal location, two No. 4-0 copper cross bonds connect the rails, forming a short circuit between the rails at these points. At the center of each block there is a track transformer, the primary of which is connected to the signal supply wires and the secondary to the two rails. This supplies A. C. current at 25 cycles, at approximately 4 volts, to

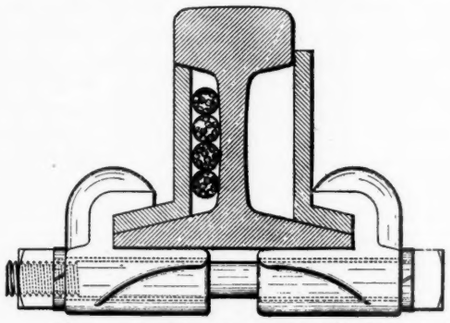


Fig. 2—Section Through Induction Coil.

the track. The path for this current is from secondary connection a to rail b, cross bonds c, rail d, connection e, to other side of the transformer secondary. At the same time a current of equal value passes from the secondary connection a, rail b-1, cross-bonds c-1, rail d-1, to the transformer; so that the A. C. current passes continuously through both rails throughout the block. At each end of the block, a coil of wire is placed along the rails with its terminals connected to the armature of an A. C. relay of the two circuit type. This coil is composed of 40 turns of No. 10 insulated copper wire, wound continuously, as in a transformer or magnet coil, along and between the rails. The wire is protected from mechanical injury by angle irons along the rails and clamped to them; and by wood trunking between the rails. Angle irons are also clamped to the outside of the rails. These angle irons, in addition to forming protection to the coils, increase their electrical efficiency by providing a core. A sectional view of the rail, coil and angles is shown in Fig. 2. The coil is 13 feet 6 inches in length, and is made of well insulated flexible wire, the insulation being impregnated with a weatherproof compound. This coil can be placed between track joints when the ordinary 30 ft. rails are used. Where the coil passes between the rails, it is placed below the base of the rail, and so that the top of the trunking which protects it is no higher than the top of the ties, providing ample protection from mechanical injury from parts dragging from cars.

The A. C. current which passes along rails induces a current of the same frequency in the coil, and this induced current is carried through the armature winding of the two-circuit relay, R. This action on the coil is the same as the action of a transformer; the rails through which the initial current passes constitute the primary of the transformer, the angles and clamps form the core, and the coil forms the secondary of the transformer. The fields of the relay are connected directly to the main signal supply wires through a field transformer, which reduces the supply from 220 volts to 55 volts, and in addition to supplying A. C. current at 25 cycles, 55 volts, to the fields of the relays at this location, also provides current at the same voltage, for the rectifier.

The relay is designed on the principle of the D'Arsonval type of electrical instrument, with a moving coil enclosed in a stationary field. The contact fingers of the relay are attached to the moving coil or armature, and in order to have a closed contact, it is necessary to have a current of the same frequency pass through both field and armature coils in synchronism. As the A. C. current from the supply at 25 cycles passes through the field coils continuously, the operation of the relay is dependent upon the current from the same source, through the track coils. A train entering a block, as at A, Fig. 1, cuts off the supply of track coil B, which is supplied from track transformer C, and in consequence the armature of track relay R is de-energized and the contact opens. As the train proceeds in the block and approaches the center, where the connections are made to the track transformer, this transformer is short-circuited to such an extent that the relay S at the opposite end of the block, as well as relay R, is de-energized, and its front contacts open.

The signal circuit, diagram of which is shown in Fig. 3, is a normally clear wire circuit with home and distant control. The wire for each home signal is carried the whole length of the home block in order that the home signal may be controlled by the relay at each end of the block, in series circuit.

The breaking of a cross bond causes the signal to go to stop

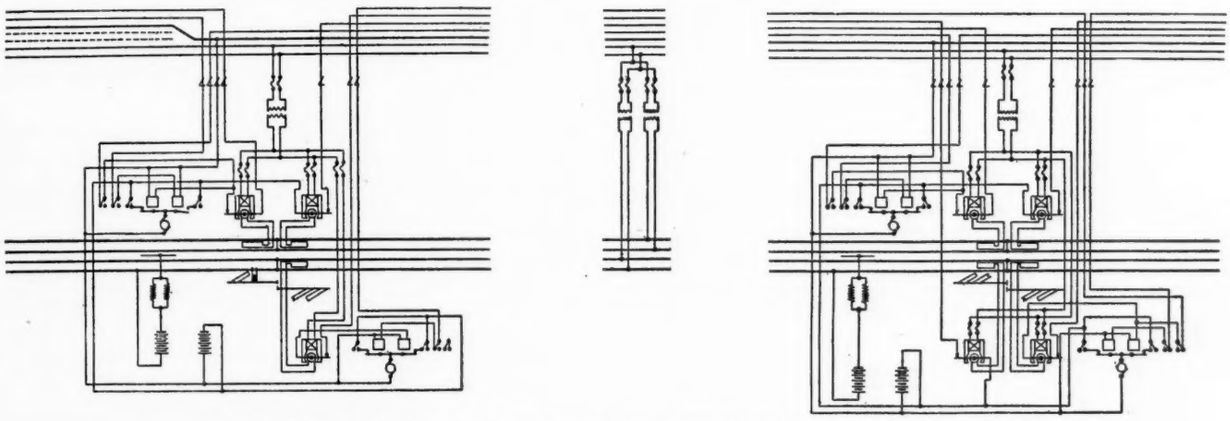


Fig. 3—Signal Circuits for Hall Automatic Block Signals—Long Island Railroad.

because the circuits from the transformers on each side of the bond are thus broken. When, however, a train is between two adjacent track transformers it completes a circuit from each. The connections of the transformers and relays are made in such a manner that the train approaching the broken bond clears the signal in advance, but the current to the train from a source to the rear will not give a clear indication. Protection against broken rails is also afforded on both rails, since a break in a rail will cut off the supply to the track coil at one end of the block and de-energize the relay at that end. The proprietors say that it is also feasible with this system to cross-bond between tracks on a two-track or four-track road at each signal location without interference with the operation of the system or the protection afforded by it.

The amount of energy consumed for each track circuit will vary according to the length of section, condition of ballast, etc. On this installation the track transformer delivers 30

amperes at 3.3 volts or 99 volt amperes, and the field transformers deliver 2 amperes at 55 volts or 110 volt amperes. The power factor of the transformers, however, is low, and the actual consumption of energy for each section is only approximately 90 watts.

This system is equally applicable to steam roads.

This track circuit was originated by C. J. Coleman, the designer of the Hall electro-gas signal.

HIGH STEAM-PRESSURES IN LOCOMOTIVE SERVICE.*

BY W. F. M. GOSS.
Dean of the College of Engineering, University of Illinois.

SUMMARY OF CONCLUSIONS.

The results of the study concerning the value of high steam-pressures in locomotive service, the details of which are presented in succeeding pages, may be summarized as follows:

1. The results apply only to practice involving single-expansion locomotives using saturated steam. Pressures specified are to be accepted as running pressures. They are not necessarily those at which safety valves open.

2. Tests have been made to determine the performance of a typical locomotive when operating under a variety of conditions with reference to speed, power and steam-pressure. The results of one hundred such tests have been recorded.

3. The steam consumption under normal conditions of running has been established as follows:

Boiler pressure	120 lbs.,	steam	per	indicated	horse-power	hour	29.1 lbs.
"	"	140	"	"	"	"	"	27.7 "
"	"	160	"	"	"	"	"	26.6 "
"	"	180	"	"	"	"	"	26.0 "
"	"	200	"	"	"	"	"	25.5 "
"	"	220	"	"	"	"	"	25.1 "
"	"	240	"	"	"	"	"	24.7 "

4. The results show that the higher the pressure, the smaller the possible gain resulting from a given increment of pressure. An increase of pressure from 160 to 200 lbs. results in a saving of 1.1 lb. of steam per horse-power hour, while a similar change from 200 lbs. to 240 lbs. improves the performance only to the extent of 0.8 lb. per horse-power hour.

5. The coal consumption under normal conditions of running has been established as follows:

Boiler pressure	120 lbs.,	coal	per	indicated	horse-power	hour	4.00 lbs.
"	"	140	"	"	"	"	"	3.77 "
"	"	160	"	"	"	"	"	3.59 "
"	"	180	"	"	"	"	"	3.50 "
"	"	200	"	"	"	"	"	3.43 "
"	"	220	"	"	"	"	"	3.37 "
"	"	240	"	"	"	"	"	3.31 "

6. An increase of pressure from 160 to 200 lbs. results in a saving of 0.16 lbs. of coal per horse-power hour, while a similar change from 200 to 240 lbs. results in a saving of but 0.12 lbs.

7. Under service conditions, the improvement in performance with increase of pressure will depend upon the degree of perfection attending the maintenance of the locomotive. The values quoted in the preceding paragraphs assume a high order of maintenance. If this is lacking, it may easily happen that the saving which is anticipated through the adoption of higher pressures will entirely disappear.

8. The difficulties to be met in the maintenance both of boiler and cylinders increase with increase of pressure.

9. The results supply an accurate measure by which to determine the advantage of increasing the capacity of a boiler. For the development of a given power, any increase in boiler capacity brings its return in improved performance without adding to the cost of maintenance or opening any new avenues for incidental losses. As a means to improvement, it is more certain than that which is offered by increase of pressure.

10. As the scale of pressure is ascended, an opportunity to further increase the weight of a locomotive should in many cases find expression in the design of a boiler of increased capacity rather than in one for higher pressures.

11. Assuming 180 lbs. pressure to have been accepted as standard, and assuming the maintenance to be of the highest order, it will be found good practice to utilize any allowable increase in weight by providing a larger boiler rather than by providing a stronger boiler to permit higher pressures.

12. Wherever the maintenance is not of the highest order, the standard running pressure should be below 180 lbs.

13. Wherever the water which must be used in boilers contains foaming or scale-making admixtures, best results are likely to be secured by fixing the running pressure below the limit of 180 lbs.

14. A simple locomotive using saturated steam will render good and efficient service when the running pressure is as low as 160 lbs.; under most favorable conditions, no argument is to be found in the economic performance of the engine which can justify the use of pressures greater than 200 lbs.

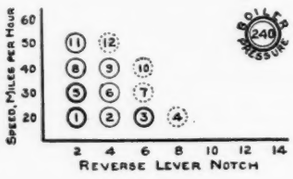


Fig. 1.

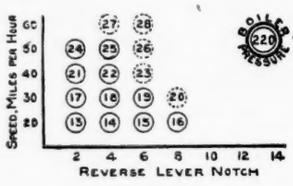


Fig. 2.

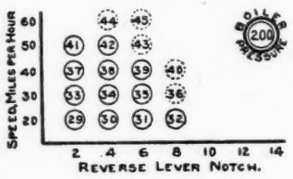


Fig. 3.

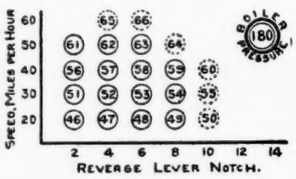


Fig. 4.

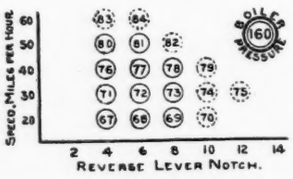


Fig. 5.

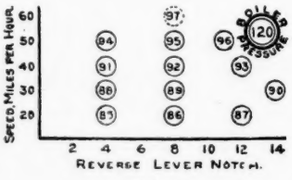


Fig. 6.

High Steam-Pressures in Locomotive Service.

I. THE RESEARCH AND THE MEANS EMPLOYED IN ITS ADVANCEMENT.

1. *Steam-Pressures in Locomotive Service.*—For many years past there has been a gradual but nevertheless a steady increase in the pressure of steam employed in American locomotive service. Between 1860 and 1870 a pressure of 100 lbs. per sq. in. was common. Before 1890 practice had carried the limit beyond 150 lbs. At the present time 200 lbs. is most common, but an occasional resort to pressures above this limit suggests a disposition to exceed it.

High steam-pressure does not necessarily imply high power. It is but one of the factors upon which power depends. The forces which are set up by the action of the engine are as much dependent upon cylinder volume as upon boiler-pressure, and when the pressure is once determined the cylinders may be designed for any power. The limit in any case is to be found when the boiler can no longer generate sufficient steam

*The Report on High Steam Pressures in Locomotive Service issued by the Carnegie Institution, of Washington, as Serial No. 66, is a publication of 144 pages dealing with a research which was carried on in the laboratory of Purdue University during the writer's connection with that university. It illustrates and describes the locomotive and other apparatus employed, and presents in tabulated and graphical form the full record of observed and derived results. In this review, the text of the report has been freely quoted, and the conclusions and arguments by which they are sustained appear as given in the original publication. The review, therefore, takes the form of a résumé of the research and its results, the complete record of which is available elsewhere. In the editorial work incident to the preparation of this review Paul Diserens has had an important share.

to supply them. The relation between pressure and power is therefore only an indirect one. But anything which makes the boiler of a locomotive more efficient in the generation of steam, or the engines more economical in their use of steam, will permit an extension in the limit of power. If, for example, it can be shown that higher steam-pressure promotes economy in the use of steam, higher steam-pressure at once becomes an indirect means for increasing power. The fact to be emphasized is that an argument in favor of higher steam-pressures must concern itself with the effects produced upon the economic performance of the boiler or engine.

2. *Preparations for an Experimental Study.*—In view of the facts stated, and with the hope of ascertaining a logical basis from which to determine what the pressure should be for a simple locomotive, using saturated steam, it was long ago determined to undertake an experimental study of the problem upon the testing plant of Purdue University. A few experiments involving the use of different steam-pressures in locomotive service were made at Purdue as early as 1895, but as the boiler of the locomotive then upon the testing-plant was not capable of withstanding pressures greater than 150 lbs., these early tests were limited in their scope.* The matter was, however, regarded as of such importance that in designing a new locomotive for use upon the plant, a pressure of 250 lbs. was specified—a limit which then was and still is considerably in advance of practice. Thus equipped, an elaborate investigation was outlined, involving a series of tests under six different pressures, representing a sufficient number of different speeds and cut-offs to define the performance of the

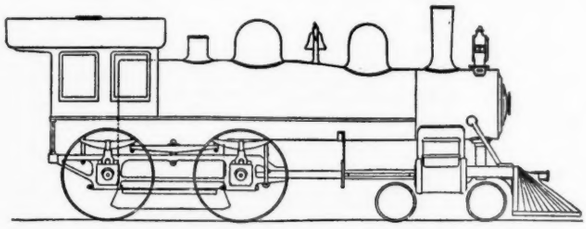


Fig. 7—Outline Elevation of Locomotive.

locomotive under a great range of conditions. But the expense of operating the locomotive under very high steam-pressures proved to be so great that the limited funds which could be devoted to the operations of the laboratory, in combination with the demands of students, which could be most easily satisfied by work under lower pressures, made it impracticable for a time to proceed with the work. A grant from the Carnegie Institution of Washington was announced late in the fall of 1903. The first test in the Carnegie series was run February 15, 1904, and the last August 7, 1905. A registering counter attached to the locomotive shows that between these dates the locomotive drivers made 3,113,333 revolutions, which is equivalent to 14,072 miles.

3. *The Tests.*—The tests outlined included a series of runs for which the average pressure was to be, respectively, 240, 220, 200, 180, 160 and 120 lbs., a range which extends far below and well above pressures which are common in present practice. It was planned to have the tests of each series sufficiently numerous to define completely the performance of the engine when operated under a number of different speeds and when using steam in the cylinders under several degrees of expansion. As far as practicable, each test was to be of sufficient duration to permit the efficiency of the engine and boiler to be accurately determined, but where this could not be done cards were to be taken. A precise statement of the conditions under which, in the development of this plan, the tests were actually run, is set forth diagrammatically in Figs. 1 to 6 accompanying, in which vertical distances represent speed, and horizontal distances the point of cut-off as determined by the notch occupied by the latch of the reverse lever, counting from the center forward. Each complete circle in these diagrams represents an efficiency test, and each dotted circle, a shorter test under conditions involving the development of power in excess of that which could be constantly sustained. The numerals within the circles refer to the laboratory numbers by which the several tests are identified.

4. The locomotive upon which the tests were made is that regularly employed in the laboratory of Purdue University, where it is known as Schenectady No. 2. It was ordered of the Schenectady Locomotive Works in 1897. In selecting a second locomotive which should serve the purposes of the Purdue testing-plant, it was decided to have the boiler of substantially the same capacity as that of the locomotive previously employed in the laboratory and which in later years has been known as Schenectady No. 1. In some other respects the new locomotive differed from its predecessor. Its boiler was designed to operate under pressures as high as 250 lbs., a limit which was then 25 per cent. higher than the maximum employed in practice. Horizontal seams are butt-jointed with welt strips inside and out, and are sextuple-riveted. The design of its cylinders and saddle is such as readily to permit the conversion of the simple engine into a two-cylinder compound. The driving-wheels of the new locomotive are of larger diameter than those of Schenectady No. 1.

The principal characteristics of the locomotive are as follows:

Type	4-4-0
Total weight	109,000 lbs.
Weight on four drivers	61,000 "
Valves: Type	Richardson balanced
Maximum travel	6 in.
Outside lap	1⅛ "
Inside lap	0 "
Ports: Length	12.0 "
Width of steam port	1.5 "
Width of exhaust port	3.0 "
Total wheel base	23 ft.
Rigid wheel base	8.5 "
Cylinders, diameter	16 in.
Cylinders, stroke	24 "
Drivers, diameter of front tire	69.25 "
Boilers, style	Extended wagon top
Diameter of front end	52 in.
Number of tubes	200
Gage of tube	12
Diameter of tube	2 in.
Length of tube	11.5 ft.
Length of firebox	72.06 in.
Width of firebox	34.25 "
Depth of firebox	79.00 "
Heating surface in firebox	126 sq. ft.
" " in tubes, water side	1,196 "
" " in tubes, fire side	1,086 "
Total heating surf., inc. water side of tubes	1,322 "
" " " " fire side of tubes	1,212 "
" " " value accepted for use in all calculations	1,322 "
Ratio of total heating surface based on water side of tubes to that based on fire side of tubes	1.091
Grate area	17 sq. ft.
Thickness of crown sheet	7/16-in.
Thickness of tube sheet	5/16-in.
Thickness of side and back sheets	5/16-in.
Diameter stay bolts	1-in.
Diameter of radial stays	1⅛ in.
Driving-axle journals: Diameter	7½ "
Length	8½ "

5. *An Alternative for Higher Steam-pressures.*—Previous publications from the Purdue laboratory have shown the possibility under certain conditions of finding a substitute for very high boiler-pressures in the adoption of a boiler of larger capacity, the pressure remaining unchanged. If, for example, in designing a new locomotive, it is found possible to allow an increase of weight in the boiler, as compared with that of some older type of machine, it becomes a question as to whether this possible increase in weight should be utilized by providing for a high-pressure or for an increase in the extent of heating-surface. The results of tests, supplemented by facts concerning the weight of boilers designed for different pressures and for different capacities, supply the data necessary for an analysis of this question. Such an analysis is presented elsewhere. (See Chapters VI. and VII.)

(To be continued.)

*Results of these tests will be found published in Locomotive Performance, John Wiley & Sons.

THE VALUATION OF RAILWAYS.

IV.

In the opinion of the Court of Common Pleas with respect to the constitutionality of the Pennsylvania 2-cent fare law, it was held that a public service corporation is entitled to a return of not less than the legal rate of interest.

By implication the Massachusetts law establishes a rate of 10 per cent.:

" . . . The Commonwealth may, at any time during the continuance of the charter of a railway corporation after the expiration of twenty years from the opening of its road for use, purchase of the corporation its road and all its franchise, property, rights and privileges by paying therefor such amount as will reimburse to it the amount of capital paid in, with a net profit thereon of ten per cent. a year from the time of the payment thereof by the stockholders to the time of the purchase." (Revised Laws, Chap. III., Sec. 6.)

The New York law specifies a rate of 10 per cent.:

"The legislature may, when any such railroad shall be opened for use, from time to time, alter or reduce the rate of freight, fare or other profits upon such road; but the same shall not, without the consent of the corporation, be so reduced as to produce with such profits less than ten per centum per annum on the capital actually expended; nor unless on an examination of the amounts received and expended, to be made by the board of railway commissioners, they shall ascertain that the net income derived by the corporation from all sources, for the year then last past, shall have exceeded an annual income of ten per cent. upon the capital of the corporation actually expended." (Laws of New York, 1890, Chap. 565, Sec. 38.)

The laws of Virginia provided for a rate of from 10 to 15 per cent.:

"When the net profits of any company heretofore or hereafter incorporated, which may be governed by this chapter, shall be such that, but for this section, dividends might be declared out of the said profits exceeding the rate of fifteen per centum per annum on the capital stock invested, laws may be passed for reducing the tolls of the company. But no law shall reduce the tolls so as to prevent dividends of fifteen per centum per annum, within thirty years from the time the first dividend of profits of the said company was declared, or so as to prevent dividends of twelve per centum per annum after the said thirty years and before fifty years from the same time, or so as to prevent dividends of ten per centum per annum after the said fifty years." (Code of Virginia, 1887, Chap. LI., Sec. 1242.)

Some of the laws bearing upon this point have been repealed; but it is a consensus of opinion that is sought, rather than the law. It seems probable that a 10 per cent. rate of income from such a business undertaking is not excessive, and it is doubtful if capital would be available in quantity for transportation uses if a minimum substantially lower were definitely established.

When, it is asked, should a carrying company be privileged to realize a stated equitable rate of return—when traffic is moving in large volume and when the stimulus of diminished rates is least needed, or when business is in a depressed condition and when an advance in rates might be highly injurious in its effects? The obvious answer to this question is, at neither of these extremes, but at a mean between them. In years of prosperity a surplus should be created, to be drawn upon in times of depression and relative inactivity. Thus with the growth of traffic will a general and continuous reduction in transportation charges be possible, without violent fluctuation, until the capacity of the transportation system is reached and a minimum cost of rendering the service is established.

It is pertinent to inquire what a valuation of the railways is likely to show—whether nominal capitalization is greater or less than actual investment. President Roosevelt in his speech at Indianapolis May 30, 1907, said:

"There has been much wild talk as to the extent of the overcapitalization of our railways. The census reports on the commercial value of the railways of the country, together with the reports made to the Interstate Commerce Commission by the railways on their cost of construction, tend to show that as a whole the railway property of the country is worth as much as the securities representing it, and that in the consensus of opinion of investors the total value of stock and bonds is greater than their total face value, notwithstanding the 'water' that has been injected in particular places. The huge value of terminals, the immense expenditures in recent years in double tracking, improving grades, roadbeds, and structures, have brought the total investments to a point where the opinion that the real value is greater than the face value is probably true. No general statements such as this can be accepted as having more than a general value; there are many exceptions; but the evidence seems ample that the great mass of our railway securities rest upon safe and solid foundations; if they fail in any degree to command complete public confidence, it is because isolated instances of unconscionable stock-watering and kindred offenses arouse suspicion, which naturally extends to all other corporate securities so long as similar practices are possible and the tendency to resort to them is unrestrained by law. While there have been many instances of gross and flagrant stock inflation, and while, of course, there remain cases of overcapitalization, yet when the statistice of the weaker roads, the overcapitalized roads, are combined with those of the stronger roads, and considered in the aggregate, in my judgment they will not be found to impair the wholesome financial standing and position of the railways as a whole; and while those railway owners and managers who have enriched themselves by loading their properties with securities representing little or no real value deserve our strongest condemnation, on the other hand our hearty commendation is due those owners and managers—representing, I believe, the large majority—who have year after year worked faithfully, patiently, and honestly in building up our great system of railways, which have knitted together in close commercial and social intercourse widely removed sections of the country and stand second only to the great business of agriculture itself in contribution to national growth and development."

Mr. Taft, in his Cincinnati address, alluded to above, gave this expression of his views:

" . . . Take for instance the so-called 'physical valuation of railways.' It is clear that the sum of all rates or receipts of a railway, less proper expenses, should be limited to a fair profit upon the reasonable value of its property, and that if the sum exceeds this measure, it ought to be reduced. The difficulty in enforcing the principle is in ascertaining what is the reasonable value of the company's property, and in fixing what is a fair profit. It is clear that the physical value of a railway and its plant is an element to be given weight in determining its full value; but as President Roosevelt in his Indianapolis speech and the Supreme Court have in effect pointed out, the value of the railway as a going concern, including its good will, due to efficiency of service and many other circumstances, may be much greater than the value of its tangible property, and it is the former that measures the investment on which a fair profit must be allowed. Then, too, the question what is a fair profit is one involving not only the rate of interest usually earned on normally safe investments, but also a sufficient allowance to make up for the risk of loss both of capital and interest in the original outlay. These considerations will have justified the company in imposing charges high enough to secure a fair income on the enterprise as a whole. The securities at market prices will have passed into the hands of subsequent purchasers from the original investors. Such circumstances should properly affect

the decision of the tribunal engaged in determining whether the totality of rates charged is reasonable or excessive. To ignore them might so seriously and unjustly impair settled values as to destroy all hope of restoring confidence and forever to end the inducement for investment in new railway construction which, in returning prosperous times, is sure to be essential to our material progress. . . .

"I am confident that the fixing of rates on the principles suggested above would not materially impair the present market values of railway securities in most cases, for I believe that the normal increase in the value of railway properties, especially in their terminals, will more than make up for the possible overcapitalization in earlier years. In some cases, doubtless, it will be found that overcapitalization is made an excuse for excessive rates, and then they should be reduced; but the consensus of opinion seems to be that the railway rates generally in this country are reasonably low. This is why, doubtless, the complaints filed with the Interstate Commerce Commission against excessive rates are so few as compared with those against unlawful discrimination in rates between shippers and between places. . . . "

Perhaps it will be objected that these opinions are too general; that after all they may be little more than mere hazards, and that therefore they are of little if any real importance. Confessedly, they are only general in their nature; under the conditions of the present no similar expression can be more. Whether they are intelligent estimates, meriting reliance pending ascertainment of their accuracy, the further availab'e indications will go far in determining. The subjoined table is commended to the study of the reader:

RAILROADS OF THE UNITED STATES CONSIDERED AS A COMBINED SYSTEM.

Year.	Bonds, notes, etc.	Stocks.	Total capital.	Interest on bonds, notes, etc.	Dividends on stocks.	Total int. and divs. disbursed.	Assumed cost.	Return of 10 per cent. on assumed cost.	Balance, 10 per ct. return undisbursed.
1898...	$5,060,763,613	$4,236,404,163	$9,297,167,776	$244,652,659	$83,995,384	$328,648,043	$7,178,965,695	$717,896,570	$389,248,527
1899...	5,124,528,304	4,307,513,427	9,432,041,731	248,760,382	94,273,796	343,034,178	7,667,533,545	766,753,355	423,719,177
1900...	5,172,623,990	4,375,360,621	9,547,984,611	247,911,177	118,624,409	366,535,586	8,173,272,005	817,327,201	450,791,615
1901...	5,412,750,189	4,069,898,993	9,482,649,182	258,121,380	131,626,672	389,748,052	8,711,459,005	871,145,901	481,397,849
1902...	5,611,608,220	4,314,055,951	9,925,664,171	268,012,950	157,215,380	425,228,330	9,513,793,364	951,379,336	526,151,006
1903...	5,924,362,481	4,357,235,824	10,281,598,305	277,891,209	166,176,586	444,067,795	10,374,288,567	1,037,428,857	593,361,062
1904...	6,314,753,108	4,397,040,970	10,711,794,078	296,063,447	183,754,236	479,817,683	11,377,942,829	1,137,794,283	657,976,600
1905...	6,682,601,049	4,484,504,943	11,167,105,992	306,255,284	188,175,151	494,430,435	12,447,499,357	1,244,749,936	750,319,501
1906...	7,125,356,355	4,546,584,294	11,671,940,649	316,990,830	213,555,081	530,545,911	13,671,613,839	1,367,161,384	836,615,473
Total				$2,464,659,318	$1,337,396,695	$3,802,056,013	$14,508,229,312	$8,911,636,823	$5,109,580,810

Balance of 10 per cent. returned undisbursed	$5,109,580,810
This amount is sufficient to extinguish:	
Assumed inflation at 50 per cent in $4,236,404,163 of stocks outstanding in 1898	$2,118,202,082
Assumed inflation at 50 per cent. in $310,180,131 of stocks issued from 1899 to 1906	155,090,065
And leave a balance* of	2,836,288,663
Total	$5,109,580,810

In explanation of the table it is remarked that the annual statistical reports of the Interstate Commerce Commission show, in addition to the outstanding capital debt of carriers reporting to it, the amounts of bonds and stocks held by other railway corporations so far as known. From 1898 to 1906, both inclusive, the reports contain an income account of the railways of the United States considered as a system; that is, with intercorporate payments and accruals eliminated. The foregoing figures dealing both with capital issues and disbursements on account of interest and dividends, are net; the object being to show the fiscal relations of the railways of the country to the public.

The assumed cost of the railways is made up of bonds, notes, and other like obligations outstanding and not held by other carriers, at par; capital stock outstanding and not held by other carriers, at 50 per cent. of par; and the undisturbed balance of a 10 per cent. return on the assumed cost for the previous year. With these exceptions, the exhibit is self-explanatory.

It may be urged that the treatment of securities outstanding at the end of a given year as if they had been issued at the beginning of the year (resorted to in order to show all the figures relating to one year on a single line), is not entirely proper, and if so the criticism will be accepted. Nevertheless many mortgages provide for the completion of construction by sections before bonds are released by the trustees; it frequently occurs that issues are made to reimburse the treasury for expenditures made months, or it may be years, in advance; and as the object is to illustrate the operation of a principle rather than definitely to establish a fact, the point is not highly important.

The review for nine years upon the premises specified leads to one or more of the following conclusions:

1. That the railways of the country, in their entirety, are not earning an equitable return upon their bona fide investment.

2. That fictitious value in the capital stock of railways, in their entirety, has long since given place to actual value, it would appear considerably in excess of par.

3. That 10 per cent. of capital invested is an excessive annual return for an enterprise of like hazard.

4. That the railways have been guilty of the flagrant and reckless dissipation of their resources.

There is reason to infer that both conclusions 1 and 2 are justified. As regards conclusion 4, it is doubtful if abuses of this character have been practised or permitted on a scale that would materially affect the combined results.

Finally, the probabilities as regards the correctness of the hypothesis that in 1898 one-half of the nominal value of railroad stocks was fictitious rest, in no small measure, upon the exhibit itself. If this be deemed inconclusive, let the preceding decade be taken, it being predicted that in 1888 the issues of bonds and stocks were equal in amount and that the latter represented no value. The ratio of stocks to bonds (not including short-term notes and miscellaneous obligations) outstanding in the hands of the public, in 1889 was 1.00 to 1.16; in 1894 it was 1.00 to 1.13; in 1899 it was 1.00 to 1.01, and in 1904 it was 1.00 to 1.18. During that period the maximum average rate of interest paid in any year was 4.33 per cent., and the maximum average dividend 2.17 per cent. (Reference: Statistical Abstract of the United States, 1907, p. 225.) At a return of 10 per cent. per annum on the par value of bonds, the stock should have earned 5.67 per cent. annually. As the highest average dividend rate paid was 2.17 per cent., there must have been an undistributed balance of at least 3.50 per cent. annually. Now 3.50 per cent. of a given amount invested annually for ten years, each instalment bearing compound interest at 10 per cent. for the remainder of the term, will aggregate 61.37 per cent. of that amount. This places a rather definite maximum upon the proportion of "water" remaining in railroad stocks at the end of the year 1897, if it be true that 10 per cent. is a fair annual return and that the railways realized that rate upon the cost of their properties.

If the foregoing is not convincing, recourse may be had to the decade next preceding (ended with the year 1887), when the maximum average interest rate was 4.65 per cent. and the maximum average dividend rate was 2.94 per cent. (Reference: Statistical Abstract, etc., as above.) When the minimum of undistributed earnings subject to re-investment an-

*Equal to 39.81 per cent on $7,125,356,355 of bonds, notes, etc., outstanding June 30, 1906.

nually would have been 2.41 per cent., with compound interest at 10 per cent., as before; and so on back to the beginning of the railroad history of the country in about the year 1830.

Perhaps no well-informed person would contend that the totality of railway stocks was ever entirely valueless. It would be superfluous, therefore, to do more than allude to the improbability that a railway property can normally be mortgaged for an amount in excess of the sum invested in it. Moreover, there are State laws and internal corporate regulations which in some instances prohibit the sale of stocks at a price less than par. There is given below a partial list of railway stocks issued from the fiscal year 1901 to that of 1906, both inclusive, together with the prices at which the offerings were made to shareholders or at which the issues were underwritten:

	Amount.	Price.
Atlantic Coast Line R.R.	$13,500,000.00	125 per cent.
Baltimore & Ohio R.R.	92,314,829.00	100 "
Boston & Maine R.R.	3,633,700.00	165 "
Chicago & North-Western Ry.	36,102,710.00	100 "
Chicago, Milwaukee & St. Paul Ry.	2,645,000.00	100 "
Great Northern Ry.	25,000,000.00	100 "
Illinois Central R.R.	35,040,000.00	100 "
New York Central & Hudson River R.R.	29,839,560.00	100 "
Pennsylvania R.R.	126,864,600.00	120 "
Pennsylvania R.R.	20,980,350.00	140 "
Southern Pacific Co.	39,569,840.00	100 "
Union Pacific R.R.	93,376,000.00	100 "
Total	$518,866,589.00	

Issues since June 30, 1906, include the following:

	Amount.	Price.
Atlantic Coast Line R.R.	$4,557,600.00	100 per cent.
Chicago & North-Western Ry.	24,401,600.00	100 "
Chicago, Milwaukee & St. Paul Ry.	124,492,800.00	100 "
Great Northern Ry.	60,000,000.00	100 "
Illinois Central R.R.	14,256,000.00	100 "
Northern Pacific Ry.	93,000,000.00	100 "
Southern Pacific Co.	35,295,123.00	100 "
Total	$356,003,123.00	

It was shown in a previous table that but $310,180,131 of railroad stock was issued and reached the hands of the public from 1899 to 1906. It is here shown that an amount $208,686,458 greater was issued within a considerably shorter time. This is susceptible of explanation on the score that not all the stocks issued pass into the possession of the public, some going into the treasuries of other carrying companies.

Some of the above issues were devoted, wholly or in part, mediately or immediately, to the retirement of convertible bonds. The prices realized for the stock in a number of representative instances, under the option of conversion, are as stated below:

Atchison, Topeka & Santa Fe.	4s	1905-55	100 per cent.
Atchison, Topeka & Santa Fe.	5s	1907-17	100 "
New York, New Haven & Hartford.	3½s	1906-56	150 "
Pennsylvania	3½s	1902-12	140 "
Pennsylvania	3½s	1905-15	150 "
Union Pacific	4s	1907-27	175 "

The railways have contributed in no small measure to the evils which have come upon them. There is connection between the reckless, unrestrained and mutually destructive competition of a few years ago and the level of rates that has since obtained. Railway managers have not entertained a uniformly exalted estimate of their public obligations. With a large number of honorable exceptions, they have been secretive, avaricious, and in many respects unscrupulous. Legitimate claims against them have been treated with exasperating indifference. In litigation they have sought to win by exhausting their weaker antagonists. They have attempted to influence legislation by means that would not bear scrutiny. They have favored shippers, commodities and places, to the detriment of others. Common carriers in name and in law, they have not been so in fact. Too often they have despised the authority that created them, and the prerogatives of those upon whom they depend for the means of existence. Nominally public servants, they have so far forgotten their province as to become in too real a sense public masters.

The people neglected their duties in the matter of corporate regulation too long, and slept upon their rights; and to the extent that they have acquiesced in these wrongs, they have participated in the perpetration of them. Such wrongs ought to meet with the firmness of authority; not in a spirit of vindictiveness to wreak vengeance, as there is reason to suspect has been the case, but in a judicial temper to enforce justice. If the state is conscious of its power it should also be conscious of its dignity and its responsibility; always remembering that wherein it works injustice it injures itself more than its victim.

The preponderance of evidence is to the effect that the railroads have not been permitted to participate equally with other business interests in the prosperity to which they have perhaps been the largest single contributor; that the country owes its railways a debt, and that this debt is long overdue. This is a new and a strange doctrine, and it will not be popular; but immediate popularity is of small importance if the doctrine be true.

The phrase "watered stock," time honored but time-worn, the ever-ready answer to criticism and the keystone of a thousand arguments, will no longer suffice. The day is in sight when, if we are to burden and oppress railway investment, we must justify our action in our own estimation and in the estimation of the world by a new and more sufficient reason, and be prepared to accept the logical and necessary consequences.

PENNSYLVANIA STATE RAILROAD COMMISSION.

The State Railroad Commission of Pennsylvania has submitted to the Governor its first annual report. The commissioners recommend the enactment of a better law for the punishment of trespassers on railway rights-of-way, both steam and electric; a law for regulating the increase of capital stock and bonded indebtedness, and one to empower the commission to regulate safety appliances at grade crossings of railways and highways. The commission is about to inquire into the practice of the railways in the matter of boiler inspection, reports having been received that many companies are careless.

The commissioners say that their experience has already shown that a commission having ample powers looking to the promotion of publicity, can give to the state valuable service. The public has been quick to recognize the benefits of a tribunal which does away with the delays heretofore suffered because of the slow movement of the machinery of the courts. The railways generally have given prompt attention to the demands made by the commission.

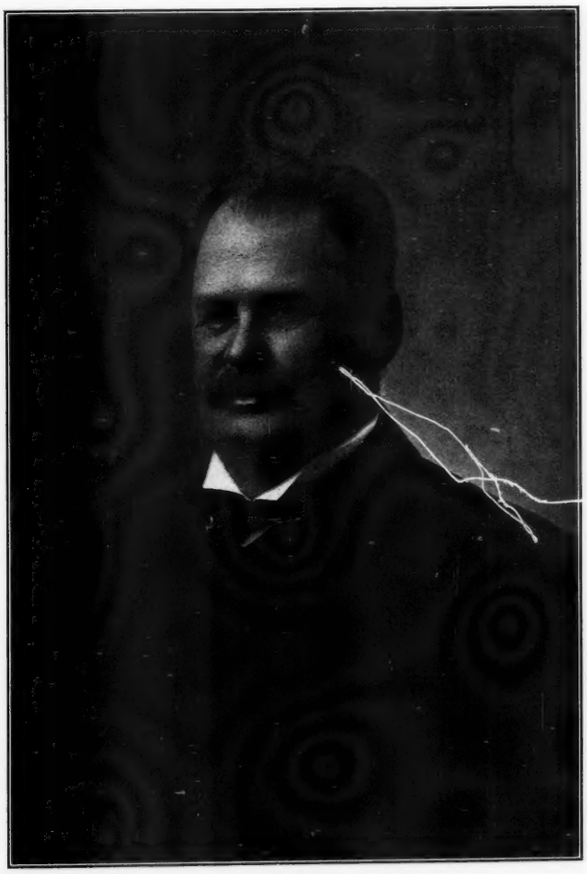
The commission proposes to classify and investigate industrial railways, believing that such lines should not have the privileges of common carriers, though they ought to be allowed to connect freely with lines which are common carriers.

The negotiations long pending between the several German State Railway administrations have resulted in an agreement to pool their whole freight car stock, amounting to nearly half a million cars. The distribution of these cars will be directed from one central office. Cars will be sent where needed without regard to their ownership and repaired at the nearest shops. The indications are that there has been much more waste by empty mileage of cars sent home in Germany than here; but the Prussian railways, even while most of them belonged to corporations, had a combination for their freight cars which effected most of the advantage which is expected from this new organization for all Germany—a more complete utilization of the freight car stock, resulting in a greater average mileage, and eventually in supplying the requirements of transportation with a smaller stock of cars than would otherwise be necessary. This agreement of the railway authorities will have to be submitted to the several governments, whose approval is regarded as certain. It will take effect April next, which is the beginning of the fiscal year of most of the railways.

JOSEPH M. GRAHAM.

Joseph Marshall Graham, Vice-President of the Erie, died of acute indigestion on February 3. He was one of the greatest locating engineers in this country. His most notable work, probably, was on the Baltimore & Ohio from 1899 to 1904, when he was chief engineer under the presidency of L. F. Loree, F. D. Underwood being second vice-president from 1899 to 1901.

Mr. Graham's mind was of a judicial character. He was quick to see the point of view of those who differed with him and careful to weigh all opinions before arriving at a final conclusion. He possessed to a high degree engineering courage, one of the rarest and most admirable forms of courage. An engineer who adopts new methods and improves on the methods of his predecessors and contemporaries stakes his reputation on his judgment. There is no possibility of concealment in case of failure; it is as if the first operation for appendicitis had necessarily been performed on a prominent man; if any mistake is made, the world cannot very well help knowing about it.



J. M. Graham.

An instance of such courage was shown when Mr. Graham was building the Bellaire bridge across the Ohio river. The United States government objected to falsework being placed in the river, and Mr. Graham planned to strengthen the old structure in such a way that it bore not only its own load but the load of the partially completed new bridge, a very unusual engineering achievement.

Mr. Graham was born at Crawfordsville, Ind., in 1850 and received his education at Lexington. He began railway work in 1873 as assistant engineer on the Grayville & Matoon, now part of the Illinois Central. By 1875 he had become chief engineer of the Bedford, Springville, Owensburg & Bloomfield, now part of the Chicago, Indianapolis & Louisville. After being employed in various engineering capacities, he was appointed in 1883 superintendent of the Dakota division of the Northern Pacific, and in 1888 was made general manager of the Northern Pacific & Manitoba Railway, of the Northern Pacific system. Two years later he became assistant general superintendent of the Northern Pacific lines east of Livingston, Mont. In 1891 he became superintendent of the Ohio and Midland divisions of the Baltimore & Ohio, with offices at Newark, Ohio, and in 1898 was made general superintendent of the Trans-Ohio division. In 1899, when the so-called Hill interests went into the Baltimore & Ohio, he was made chief engineer, and the low-grade improvements that were made on that line, some of which have not yet been completed, were made on his recommendation.

Of a genial disposition, he made friends easily and held them permanently. He was a man of large ideas, and held broad views of the railway questions of his time. His habits of mind, mature judgment and sound conclusions on all practical topics of railway economics made him an invaluable addition to any organization.

Combined with his brilliant mental resources, he was of a modest and unassuming nature, and possessed the traits which made him honored and respected of men.

Mr. Graham in 1880 married Miss Evelyn Norton, of Cleveland, who survives him. Miss Norton was the daughter of the Reverend Albert Norton.

TESTING THE CONSTITUTIONALITY OF THE COMMODITY CLAUSE.

The brief in behalf of the railways in the commodity clause suit now being tried by the Supreme Court divides the legal points discussed under seven heads:

1. The commodities clause is not applicable in the case of carriers who do not own or mine coal, but simply own shares of stock in coal companies.

2. The commodities clause is unconstitutional, because its penalties are so prescribed as practically to bring about a denial of an opportunity by railway companies to obtain a judicial determination of the questions involved.

3. The commodities clause is unconstitutional, because, making illegal discriminations, it is not "due process of law."

4. The commodities clause is unconstitutional, because it forbids a railway company, obeying every rule of transportation prescribed by Congress, to transport an article, of commerce which not only is harmless, but is one of the necessities of life. The act is not a regulation, but a prohibition.

5. The commodities clause is unconstitutional, because it was intended to violate, and does actually violate, a right reserved to the states.

6. The commodities clause is unconstitutional, because in violation of constitutional restrictions upon the exercise of the right to regulate commerce it deprives of "liberty and property."

7. The commodities clause is unconstitutional, because it is, in effect, a taking of private property for public use, without just compensation.

The brief concludes "with the establishment of this doctrine, imperialism will have replaced federalism."

The brief in part says:

We are quite willing, for the purpose of this case, to concede the vesting in Congress of the power to regulate interstate commerce; and that, included in this power to regulate, is the power to regulate carriers.

There can be no Federal divorce of the dual relation of public carrier and private transporter. The divorce of the dual relation cannot be made within the state of Pennsylvania, which brought the same about. We contend that to forbid the carrier who has reached the state boundary line with his goods the right to transport them into another state, because such goods, at the moment they are so ready

to be transported, are owned by him, is a prohibition of commerce in articles universally recognized as proper subjects of commerce. It far transcends a "regulation."

If a power exists, to the extent claimed, an individual who acquired horses and wagons, for use in transporting his goods, could, after he had consented to carry a small quantity of goods for other persons, be forbidden to carry any other than the goods of such third persons. More than this, the doctrine would cover the case of such individual who had never carried any goods, other than his own.

The ability of the inhabitants of other states to obtain coal, and of independent coal miners to have their coal transported, has resulted from the construction of railways by companies for the express purpose of transporting their own coal. It seems an anomaly to use the railway for the benefit of other persons and to close it against those for whose benefit it was built.

Between two owners, in the state of Pennsylvania, neither charged with any public duty, discrimination is made to such an extent that one owner is forbidden to have his coal transported. Is there any possible justification for such exercise of power to be found in that of regulation of interstate commerce?

As we have said, the right of an owner of coal to sell the same, and, after sale, to transport into another state, is one not derived from the Constitution of the United States. It is inherent right. The exercise of this right may be regulated. It cannot be prohibited.

If Congress can forbid the common carrier from transporting coal belonging to it, or belonging to coal companies in whose shares it is interested, because of the power to "regulate," it is difficult to so limit the right as not to extend it to a prohibition of carriage by the common carrier of coal owned by one of its stockholders, or by majority stockholders.

The government brief has been filed. The railways made party to the 12 suits are: Delaware & Hudson, Erie, Central Railroad of New Jersey, Delaware, Lackawanna & Western, the Pennsylvania and the Lehigh Valley.

The counsel for the government in part says: These cases involve two questions, namely: (I.) Is the commodities clause constitutional? (II.) Does the commodities clause, properly construed, apply to these several defendants?

I.—An act of Congress duly passed is presumed to be constitutional and the burden of argument rests on those who deny its constitutionality to show that, in fact, the legislative branch of the government has exceeded its powers. The constitutionality of the commodities clause is and can be assailed on one or the other, or both, of only two grounds, namely: First, that it is not within the grant of power of Congress to be professedly exercised in its enactment, or second, that its enactment falls within one of the prohibitions of the Constitution. The commodities clause is enacted in the professed exercise of the clause of the Constitution reading: "The Congress shall have power to regulate commerce with foreign nations and among the several states and with the Indian tribes."

The commodities clause does not prohibit the transportation in interstate commerce of any commodities, nor does it prohibit any common carrier from engaging in interstate commerce. It prohibits the transportation in interstate commerce of commodities having certain incidents by common carriers belonging to a particular class, and occupying to the commodities in question certain specific relations. The commodities to which it refers may be transported in interstate commerce in any way except by railways, and by any railways, except such as are directly or indirectly interested in them, own them, wholly or in part, or have mined, manufactured, or otherwise produced them. It constitutes, therefore a regulation of commerce among the several states in the form of a prohibition applicable to the transportation in such commerce of some designated commodities by some designated common carriers engaged in such commerce.

All regulation involves partial and limited prohibition, and the Supreme Court has repeatedly upheld regulations of interstate trade which involved partial and limited prohibitions of such trade.

No case can be found wherein this court has declared an act of the Congress, otherwise valid, unconstitutional because of a similar objection to the validity of the acts of other legislative bodies. When legislation fixing the rates of public service corporations deprives those directly affected thereby of all profit or any return whatever on investment it may be void, not becaues in itself unreasonable and therefore beyond a constitutional grant of legislative power, but because confiscatory or spoliatory, and therefore void by virtue of express constitutional prohibitions.

What is said above as to the objection that this enactment is unreasonable is still more clearly true with respect to the objections that it is harsh or inequitable. Granted the existence of the power, all questions of public policy connected with its exercise are for the legislative, and not the judicial branch of the government. It is therefore respectfully submitted that the moral or economic characteristics of the legislation involved in this case do not affect us constitutionally.

The terms of Article 4, Section 1, of the Constitution declare: "Full faith and credit shall be given in each state to the public acts, records and judicial proceedings of every other state." It is claimed that the charters of certain of these defendants conferring on them powers to engage in interstate commerce, constitute "public acts" of the states granting such charters, to which "full faith and credit" is not given by the commodities clause. That this objection is without merit would seem to be so plain on the face of the constitutional provision itself as to render any discussion beyond its mere statement inappropriate.

The terms of the fifth amendment, declaring, "No person shall be * * * deprived of life, liberty or property without due process of law," it is alleged that this prohibition is infringed. First, because the commodities clause makes of little or no value large investments legally made and thus deprives the defendants and others of their property without due process of law. If this is the consequence of a legitimate exercise of the power to regulate interstate commerce or any other constitutional power by the Congress, then it is one of the incidental hardships involved in having a Federal government and which should have been foreseen by the defendants when they made the investment; second, because the enactment of the commodities clause has rendered contracts already made unprofitable or commercially impracticable of performance and interfered with the course of the defendant's business, thus conventionally depriving them and others of both their "liberty" and their "property" without due process of law. The same reply may be made to this claim as to the one last considered: Some measure of individual hardship is incidental to the enforcement of all laws. The rights asserted are neither "liberty" nor "property," according to the true construction of the fifth amendment, and it is to be noted that the defendants and other parties interested were given two years wherein to adapt their business to the new legislation; third, because the clause excludes from its prohibition a certain class of commodities—that is to say timber and its manufactured products—and thus becomes discriminatory as against the owners of other commodities. This objection appears to assume that the term "due process of law" in the fifth amendment, which is repeated in the fourteenth, is equivalent to the words "the equal protection of the laws" also found in the last named amendment. The soundness of this position is not conceded, but in this case, it would seem sufficient to point out the inapplicability of the prohibition to a case where only a particular kind of property is exempt from the operation of a statute and the exemption of its owners is a mere incidental consequence.

As to the terms of so much of the same (fifth) amendment

as declares, "nor shall private property be taken for public use without compensation," no "property" is "taken" in this case at all. If the value of property is incidentally diminished as an indirect consequence of the legislation in question no claim for compensation can be founded upon such loss of value.

To the terms of the eighth amendment, which declares that "excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted," the argument is that the enforcement of the commodities clause would expose the defendants to the payment of enormous fines, because every time they violated it, they would be subject, at least, to the minimum penalty imposed by Section 10 of the act to regulate commerce, and as they might be construed to violate it every time they transported any of the prohibited commodities, all of them would be quickly bankrupted. It is sufficient to say in answer to this contention that all they have to do to avoid these consequences is to obey the law. In any event, however, the provision of an unconstitutional penalty in one clause would not invalidate a constitutional prohibition contained in another clause of the act and which can be enforced by other remedies.

It was urged that the enormity of the fines which might accumulate before a litigation could be determined would deprive these defendants of an opportunity to test the constitutionality of this section. Without discussing the merits of this connection, the form of the present suit is sufficient to show that it has no place here.

Finally, on this branch of the case it is further submitted that in the enactment of the commodities clause Congress exercised a power fully and clearly conferred by the Constitution and did not infringe any of the prohibitions therein contained, and that the commodities clause is undoubtedly constitutional.

At the opening of the trial it was agreed between counsel and allowed by the court that there should be six hours for argument, the government to consume three hours and the railways three hours.

Counsel for the government asserted that the railways are corporations of the state of Pennsylvania, or of other states, but doing business and maintaining offices in Pennsylvania, and are common carriers within the interstate commerce laws; that the transportation here is interstate commerce; that the defendants' own coal and coal lands through conveyances and leases, or own the entire capital stock, or a large majority of the capital stock of certain coal companies which are corporations of the state of Pennsylvania, and by reason of this stock ownership exercise full control and direction over the operations of these coal companies, or own all or some part of the capital stock of other corporations of the state of Pennsylvania which own coal lands and mine and sell coal under the direct management of officers and directors who are also officers or directors of the defendant companies.

The answers show in substance as follows: The Delaware & Hudson was incorporated under a law of New York, and the claim of authority thereunder to construct a canal from the anthracite district in Pennsylvania to the Hudson river, to purchase coal in Pennsylvania and to transport to the market the coal mined in the latter and supplemental acts of New York and various acts of Pennsylvania between 1823 and 1871 are alleged to authorize the defendant to purchase and hold coal lands and to mine and transport the coal mined from such lands. Because of the supported public policy of Pennsylvania and New York fostering the coal trade and state legislation towards this end it is claimed that defendant is a coal mining company and not a railway company within the meaning of the commodities clause, although having power to acquire canal and railways principally for the transportation of its own coal and only incidentally as a common carrier for others.

It is admitted that the defendant owns all the shares of the capital stock of the three coal mining companies referred to in the petition and bill, but it is averred that their stocks were acquired before any of the interstate commerce laws were enacted, although it does not appear when they were acquired.

It is claimed that, except as to steam sizes, the coal mined is sold at the mines to third persons before the interstate transportation begins; and as to the steam sizes, they are transported into the state of New York, and there stored until sold or used. As to the coal sold at the mines, therefore, it denies that it owns it when the interstate transportation begins, or during the transportation.

As to the steam sizes it is denied that such transportation of such coal for its own account over its own railway constitutes interstate commerce or is within the commodities clause.

The defences based upon various arguments are thus summed up; that the commodities clause is invalid because it would deprive defendant of the valuable enjoyment of property lawfully acquired and held without compensation and without due process of law contrary to the fifth amendment to the Constitution; that the right to engage in interstate commerce is not a right created either by the Constitution of the United States or by Congress, but one which existed previous to and independently of both; and that the investments made by the defendant under the authority of the state laws have resulted in vested rights beyond the power of Congress to impair or take away; that the legislation is invalid under the fifth amendment because it discriminates between common carriers which are corporations, and those which are not; between carriers which are railways and those which are not; between common carriers of timber and common carriers of other commodities; that the legislation is invalid between its operations and effect are not merely to regulate interstate commerce but to prohibit it; that it is invalid under the eighth amendment because it imposes excessive fines for its violation; that it is invalid under the tenth amendment because it seeks to exercise a power which has been expressly reserved to the states and the people thereof.

The government in its argument says no case can be found wherein this court has declared an act of the Congress otherwise valid unconstitutional, because the court held it unreasonable. What is said as to the objection that this enactment is unreasonable is still more clearly true with respect to the objections that it is harsh or inequitable. It is therefore respectfully submitted that the moral or economic characteristics of the legislation involved in this case do not affect us constitutionally.

The opinion of the lower court, which held the commodities clause unconstitutional and from whose decision (*Railroad Age Gazette*, September 18, 1908, page 935) the present case is an appeal by the government, said: "The general claim, then, common to the defendants is this: That by force of their state charters, and of supplemental powers derived from these states by later legislation, and through the other corporation franchises so acquired, they have vested rights of property and of free commerce in property which cannot be impaired; and that the exercise of federal power over interstate commerce by the commodities clause is not a regulation, but a prohibition of commerce, and deprives them of their property, in violation of the Constitution.

In considering whether the commodities clause does, in fact, violate this inhibition of the Constitution, the opinion alludes to the enormous agregate of property affected, its possession by defendants for a long period, the harmless character of the ownership, the inviolation and encouragement by the state to the defendants, so to invest their funds; finds the transportation right to the most valuable and important of the righs of property and to the coal owners, and details and emphasizes the enormous losses which will occur if defendants either do not mine and ship their coal, or throw their coal properties on the market; and the conclusion is

that the statute is a practical and substantive violation of the letter and spirit of the fifth amendment.

In reply to the argument that the exercise of police power by the states has been exempted by judicial decision from the similar inhibition of the fourteenth amendment and that the power of Congress to regulate commerce is the equivalent of state police powers in this respect, it is said that the Federal commerce power is complete in itself, distinct and substantive, while state police power comprises an indefinite mass of powers, and that there is no equivalent between them and the power to regulate commerce which does not pertain to other powers granted to Congress; that the reasonableness of the exercise of the police power is the position in every case, and on the one hand the courts will not permit these powers to constitute palpable invasion of rights, or, on the other hand, allow indirect and incidental consequence to personal or property rights to affect adversely their validity.

Attorney-General Bonaparte in closing the oral argument for the government contends that if the commodity clause is prima facie a valid regulation of interstate commerce, it must be void, if at all, because it contravenes an express prohibition of the constitution.

The prohibition forming the real ground of the decision in the lower court is contained in the due process clause of the fifth amendment.

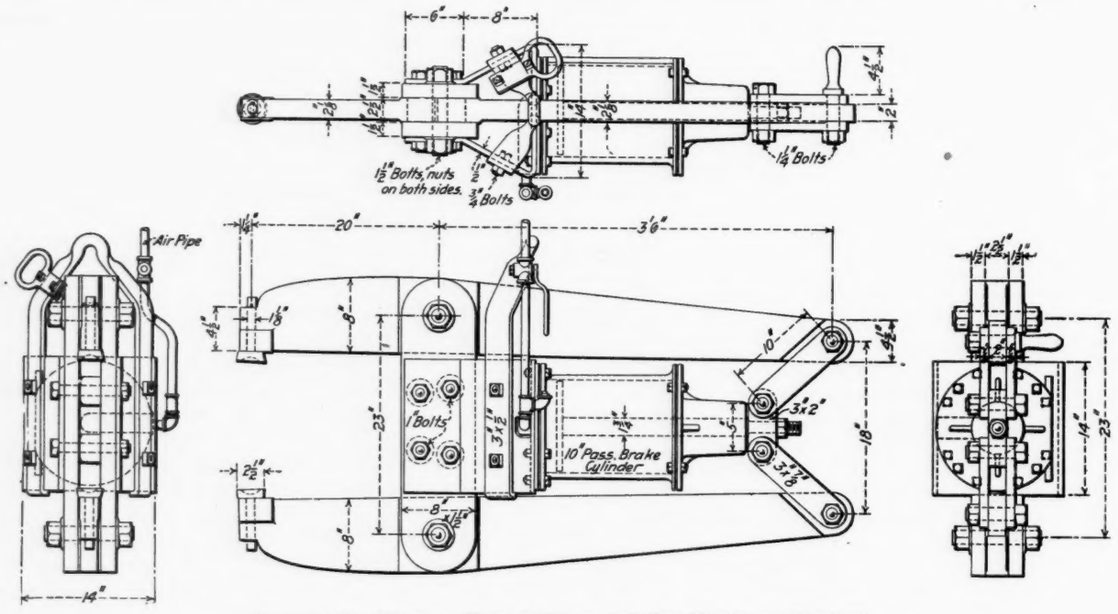
These guarantees were placed in the constitution by amendment as safeguards against the exercise by the government of arbitrary power. Whether, therefore, a law is free from objection based upon the due process clause depends on the meaning of the word "arbitary use," whether or not it operates harshly, is not the question. Any law may impose inequalities and hardships. A thing is done arbitrarily when done without cause or reason shown.

Something more is required to render the due process clause effective to defeat legislation than to show that a complaining party will be deprived of a market for his property, or that the legislation deprives him of some of the uses of which, without such legislation, he might devote it. The legislation must more nearly affect the value of ownership than would an act, otherwise constitutional, closing to him particular markets. In the Monongahela bridge case an act of Congress did directly and absolutely deprive the corporation, without compensation, of that which all must concede was property, namely, certain profit-producing franchises rightfully granted by a state [and this was held constitutional]. Here the defendants lose neither their franchises nor the title to any of their property, and if the value of that property is affected, such effect results only indirectly from the legislation assailed.

PNEUMATIC RIVETING MACHINE.

There is in use at the Detroit shops of the Michigan Central Railroad a simple pneumatic riveting machine that is very efficient, which was designed and made on the premises. It consists of two heavy straps to which are pivoted the two working levers, and between these is the operating cylinder. The method of working is exceedingly simple and is clearly shown by the engraving. Compressed air admitted back of the piston forces out the rod, and by operating the toggles separates the levers at the back and closes them in front.

In order to adapt it to various thicknesses of metal and lengths of rivets, the adjustment is made in the size of the rivet sets, which can be adjusted to take stock varying from 1 in. to 8½ in. All of the forgings for the machine were made from scrap axles and the cylinder is an old 10 in. passenger air brake cylinder. It is used for all classes of work, but principally for riveting truck bolsters and the yokes to drawbars. It has strength and power sufficient to close rivets up to 1½ in. diameter, and is used for all the smaller sizes. It will operate and do satisfactory work with an air pressure of from 65 to 70 lbs. per sq. in., but for the large rivets a pressure of 100 lbs. per sq. in. is to be preferred.



Pneumatic Riveter; Detroit Shops of the Michigan Central.

The machine is suspended from a crane by a chain hoist, with which it can be raised or lowered to meet the requirements of the work in hand. Beneath there is a revolving table 16 in. high and 2 ft. in diameter, upon which the articles to be riveted can be placed, so that the whole forms a very convenient and efficient machine for the work for which it is adapted and one whose original cost was low.

Austria is about to incorporate some of the most important corporation railways into its state system, and it is purposed, when that is done, to raise the State Railway rates. The railways which are to be absorbed have rates higher than the present State Railway rates; and it is urged that the average rates will remain lower than at present after the contemplated advance is made.

General News Section.

A bill has been introduced in the Idaho legislature to create a State Railroad Commission of three members, to be elected for terms of two years.

The Belen cut-off of the Atchison, Topeka & Santa Fe will be opened for through freight traffic on March 1. The arrangements for passenger traffic have not yet been fully decided upon.

A bill has been introduced in the Colorado Senate to prevent the removal of the general offices of the Colorado & Southern from Denver. It has been rumored that the headquarters of the road may be consolidated with those of the Chicago, Burlington & Quincy at Chicago.

Beginning on February 1, the receivers for the Cleveland Railway and the Municipal Traction Co., operating street railways in Cleveland, adopted 5-cent fares on about 80 per cent. of the lines under their charge, the court having ordered this action because of the very low income derived from the business done on the 3-cent basis. The 3-cent fare is continued on certain lines where the franchises require it.

The agents at the stations on the Pittsburgh division of the Pennsylvania were recently taken by the Superintendent on an excursion over the branches in the coke region in order to acquaint them with the lay of the land and the situation of the numerous connections; but the report that this excursion marks a new departure in the practice of the company is not true. The regular meetings of the agents will be continued on the same plan as in the past.

A bill has been introduced in the Montana legislature to give the State Railroad Commission full authority to regulate the equipment of trains, cars or engines with safety appliances and to inspect the same and enforce its regulations. The bill practically requires the railways to report the condition of locomotive boilers and engines in service, and to provide for their inspection, and to make and enforce regulations concerning the making up of trains, the establishment of the block system, etc.

Train auditors are to be employed on the trains of the Southern Pacific in Louisiana and Texas. The Pacific system of the company has them on some divisions. A "train auditor" takes the place of the conductor in gathering tickets and fares occasionally, as distinguished from a "train collector" who supplants the conductor in this work regularly. With the train-auditor system a few men can attend to many trains, boarding a train as a surprise to the conductor; whereas the collector system requires a collector for each train.

A reciprocal demurrage bill is pending in the Nebraska legislature. On February 3 arguments for and against it were made before a joint sub-committee of the joint railway committee. The principal argument against the bill was made by Arthur Hale, Chairman of the Committee on Car Efficiency of the American Railway Association. A. W. Dickson (Burlington), Edson Rich (Union Pacific), and C. C. Wright (C. & N. W.), also opposed it. Arguments for the bill were made by representatives of the state lumber nd coal dealers' associations.

The executive committee of the Oklahoma Federation of Commercial Clubs has memorialized the legislature urging an amendment to the constitution to eliminate that provision which prohibits any transportation or transmission company organized under the laws of the state to consolidate with any similar company organized under the law of any other state or of the United States. The memorial says that railways in Oklahoma should be domestic corporations in order that the state may have control of their construction, but that their operation thereafter as independent lines is a practical business impossibility in most instances, and that therefore consolidation with existing lines should be allowed.

The Railroad Commission of Indiana has prepared a bill to be presented to the legislature to authorize the Commission to gather information regarding grade crossings outside of cities and incorporated towns, to examine the condition of highways, and, when found expedient to notify the railway and the County Commissioners of a hearing to determine if the crossing should be abolished. One-fourth of the cost of separations would be borne by the county and three-fourths by the railway or railways. When a railway desired to make a new crossing at grade it would first have to get the consent of the Commission. Another bill proposes to provide a fine of from $5 to $100, or imprisonment from 5 to 30 days, for trespassing on the tracks of steam or electric roads.

A wide difference of opinion appears to exist between H. A. Fairchild, Chairman of the Railroad Commission of Washington, and Commissioners Jones and Lawrence, regarding the proper basis of division of the valuation of the railways in that state as between intrastate and interstate business. They are trying to find an equitable basis for a division so as to make a valuation to be used as a basis for the readjustment of intrastate rates. The majority of the Commission favors dividing the valuation on the basis of cost of operation, but Chairman Fairchild favors dividing on the basis of net earnings. Mr. Fairchild contends that the theory of the majority would lead to the confiscation of the railway properties of the state. A road performing a dual service, intrastate and interstate, may carry interstate greatly in excess of its state business, but if it cannot earn on its interstate business any substantial net return, and it can and does earn from its intrastate business a return on substantially the value of its entire property, and its intrastate rates per se are not unreasonable, it most follow that the state value is practically the entire value.

The Pennsylvania state railway commission, at the suggestion of Forestry Commissioner Conklin, has asked the railways of the state 11 questions as to the precautions they are taking to prevent fires on state and other forest lands. Among the questions asked are: How many fires occurred along the railways' rights of way in 1908 which were attributable to operations of the road and the amount of damage resulting; the details of settlements and suits as a result, and whether any of the employees of the road have been paid by county commissioners for fighting fires along the lines; means taken by railways to prevent forest fires; what system of inspection is followed; what devices are employed to keep down sparks or to prevent dropping of hot coals on tracks; whether the devices are on all locomotives, and whether they are maintained as carefully as if they were a part of the operating machinery; what penalties are imposed for failure to use spark arresters and dumping of hot ashes; if they allow maintenance of way men to burn ties along the tracks and to supply copies of the rules for fighting fires.

The Hine system of organization, described in the *Railroad Age Gazette* on January 22, page 150, in its application to the Nebraska division of the Union Pacific, has now been extended to Morgan's Louisiana & Texas Railroad & Steamship Co., to the Louisiana Western Railroad and the Iberia & Vermillion Railroad Co., these properties jointly constituting the Louisiana division of the Harriman lines. Effective February 8, the Louisiana division discontinued among its officers the use of the titles master mechanic, resident engineer, trainmaster and traveling engineer. The circular says that G. C. Scarlette, H. N. Norton, L. Mims and C. F. Bradshaw are designated assistant superintendents, and will be obeyed and respected accordingly. Heretofore Mr. Scarlette has been assistant superintendent at Lafayette, La.; Mr. Norton has been traveling engineer; Mr. Mims resident engineer at Lafayette, and Mr. Bradshaw trainmaster. Each of these officers continues charged with the responsibilities heretofore devolving upon him and, in addition, assumes such other duties as may from time to time be assigned. Those of the assistant superintendents who are located in the same building have one consolidated office file in common with the superintendent. The circular says that all communications on the company's

business originating on this division, intended for the superintendent or for any assistant superintendent, should be addressed simply "Assistant Superintendent" (Telegrams, "A. S."). The further details of this plan are identical with those printed Jan. 22 on page 150. At the same time that the change is made the jurisdiction of J. P. Nolan, Master Mechanic, is confined to the Algiers shops and the Mississippi terminals.

A public utilities bill has been introduced in the Utah legislature. It proposes to create a public service commission and gives it comprehensive powers of control of all kinds of public utilities. The Salt Lake *Tribune* says of the measure: "It will, if it becomes a law, enable the executive to find places for impractical men, but who are good churchmen and tithe payers."

On February 5 Representative J. G. Miller, Saline county, introduced in the Missouri legislature 20 bills for the regulation of railways, all at the request of the state railway commission. About a dozen other members also introduced measures to regulate railways. The Miller bills contain provisions requiring railways to get the approval of the commission before putting new tariffs into effect; freight houses to be established at all grade crossings; railway managers to swear under oath regarding contracts with other lines to discover whether or not they own competitors; prohibiting railways from charging a higher rate for double-decked sheep cars than is charged for cars for cattle; wiping out the one-half of 1 per cent. shrinkage on grain now allowed railways and other things too numerous to print. One other measure would compel railways to report personal injury wrecks by telegraph.

Howard Elliott, President of the Northern Pacific, was the guest of honor and principal speaker at a dinner given by the Spokane (Washington) Chamber of Commerce on January 27. Mr. Elliott said that in the five years that he has been president of the Northern Pacific the company has spent $100,000,000 for new branches, new track and grade revision. In the last three years it has spent more than $3,000,000 between Helena and Spokane, to restore damage caused by floods and washed out tracks and to provide better safeguards for the future. This was done when the cost of labor and materials was extremely high and the volume of business greater than the railway could handle. It seemed to him that in the last five or six years western people had put the cart before the horse in discussing the relations of railways to the public. There had been a hurricane of attacks on railway owners and operators when what the western country needs is that encouragement be given to the railways so that they will provide more facilities. It would be a good thing if all who desire a little fairer treatment would consider the desirability of devoting their brain power to building up their cities instead of harassing some one interest.

Chaos in Car Fares.

It looks like a period of needlessly high fares on many of the street railway lines of the city [Cleveland], needlessly high-priced transfers on others, and needless confusion on the entire traction system—all as the fruit of Mayor Johnson's unwillingness to admit the failure of his old vote-getter and office-winner—three-cent fare.

He cannot bear to face the facts and confess the truth. He clings desperately to the dream of recovering his political strength and maintaining his grip upon the municipal government through the instrumentality of his old battle-cry. And so his obedient councilmen, helpless without him and hanging to his wobbling machine as their one chance for re-election, will doubtless refuse the temporary, revocable franchise grant asked by the street railway receivers.

It must be confessed that the request for permission to charge five cents for cash fares and sell tickets at the rate of six for 25 cents strikes the average Clevelander unfavorably. He remembers too well the offer made by the old Cleveland Electric Railway Company of seven tickets for a quarter, with free transfers and the best of good service. That offer may have been excessively liberal. It may have overshot the boundary of prudence and good business judgment, but it was made in good faith, and it is hard to convince the people of this city that it ought not to be repeated.

Yet the fairest and safest way is to follow Judge Tayler's advice, grant a revocable franchise which the council can withdraw at any time, let the receivers charge more than the lowest fare which will make it possible to maintain the property in their care and give good service, and then, after past losses are made good and the debts incurred in the last few months are paid, cut down the fare, in a permanent franchise, to whatever may prove the lowest limit consistent with good service, reasonable expansion of the traction system and no more, at any time, than 6 per cent. for the owners of the property upon their actual investment—the real value of their lines.

That is the road to lasting satisfaction for reasonable citizens. It is the highway of justice. It is not, it appears, Mayor Johnson's way. He is quite certain to obstruct the path of civic progress in that direction. The obvious remedy is to remove him from the city's road to street railway peace with honor.—*Cleveland Leader.*

Fires on P. R. R.

The Pennsylvania Railroad Insurance Department reports that 274 fires, occurring in 1908 on property valued at more than $6,750,000, were extinguished by the railway's own employees with the company's apparatus. During the past year additional equipment for extinguishing fires has been placed at many points. The organization has been further developed by special training of employees, and locomotives in yard service have been equipped with special pumps.

A circular is to be issued giving the causes of all the fires on the system in 1908. Including the fires to which city fire departments have been called, a total loss of only $346,149 has resulted from 1,397 fires of railway property in 1908; the property endangered was valued at more than $260,000,000.

Loading hot ashes or coke in cars caused 658 fires, and damage to as many cars. Fifty fires, entailing a loss of $59,019, started on adjacent property. Spontaneous combustion was responsible for a loss of $3,300. Sixteen fires resulting from careless handling of lighted cigars, cigarettes and matches, caused a loss of $3,586. Seventeen fires were due to tramps, with a loss to the company of $14,350; and 34 fires, with a loss of $16,450, were incendiary.

Washington Letter.

Washington, Feb. 10.—With the abandonment of railway legislation for this session of Congress there has come a complete rearrangement of plans on the part of those legislators interested in the common carriers. The most important fact to develop in connection therewith, so far, is that all hands will look to President Taft for guidance in regard to this matter, and this causes it to be predicted that if any attempt is made during the Taft administration to amend the Hepburn law it will mean a return to some of the principles laid down in the original Esch-Townsend bill.

This conclusion is forced on all who have given the subject attention for the reason that Mr. Taft and Mr. Townsend have already had one conference relating to business in the house and for the further reason that they are known to be practically in accord regarding what, if anything, ought to be done in the way of revamping the Hepburn law. They agree that there should be a court of commerce, a sort of national court of first instance, to try all cases affecting the rate and other questions now handled by the Interstate Commerce Commission. Mr. Taft has gone so far as to indicate that he would be inclined to make over the Interstate Commerce Commission into such a court, placing the work of making up the cases, collecting evidence, receiving complaints, etc., in the hands of the commissioner of corporations, and requiring the department of justice to detail an assistant attorney-general to act for the government in cases to be prosecuted.

The Esch-Townsend bill, which was not as radical as the Hepburn act, provided for a court to be made up of certain circuit judges, to be designated by the president. But Mr. Townsend is disposed to believe Mr. Taft's plan has points of superiority over any other suggested. The trouble with the Interstate Commerce law as now amended is that it is

too clumsy. Neither the railways nor the shippers can be assured of action within a reasonable time. And the volume of business offered is so enormous that there is danger of injustice unwittingly inflicted upon one side or the other of a controversy.

Mr. Taft's idea is that under the commissioner of corporations the whole force of the department of commerce could be thrown behind the business of investigation, many minor and unjustifiable complaints be rejected, and the Interstate Commerce Commission asked to pass on only such cases as fully warranted the effort. In this way he expects to quickly bring the carriers and the shippers into harmonious relations by defining their relative rights so as to give much less cause for friction than now exists.

Letters have been written to all organizations of shippers and other commercial bodies that have been asking for legislation amending the Hepburn law, advising them of the situation, and the possible radical revision of the law under the new administration. They have been assured that this may in the end be for the best, since the law as it stands has not yet had time to show its points, good and bad. G. G.

Strike on North Western Passenger Station.

Work on the new passenger station of the Chicago & North Western in Chicago has been suspended by a strike of union workingmen employed by sub-contractors of the George A. Fuller Company, which has the contract for building the station. The strike was ordered by Martin B. Madden, head of the Associated Building Trades of Chicago, and familiarly known as "Skinny" Madden. Precisely why it was declared the public has not yet been able to find out. It has been openly charged in the Chicago daily press that such strikes frequently have been called in Chicago for purposes of blackmail. State's Attorney John E. W. Wayman has asked that everyone having evidence of such blackmailing operations lay it before him, indicating that he will cause indictments of any men whose guilt probably can be proved.

Advertising Up to Date.

The arm of the model semaphore illustrating the block signal system of the Union Pacific on exhibition in the window of the office of that road, rises and falls every minute, attracting a great crowd of interested Seventeenth street pedestrians constantly. It has been on exhibition since Saturday evening, and the interest of the public is clearly shown. As an advertisement the model rather lays over anything exhibited here for some time.—*Denver Republican.*

Despatching by Telephone on the Santa Fe.

The Atchison, Topeka & Santa Fe will begin installing the necessary equipment for despatching by telephone on 1,124 miles of its road as soon as the material can be supplied. The territory to be equipped includes the line from Chicago to Emporia, Kan., via Ottawa, Kan.; from Bakersfield, Cal., to Oakland, on the Valley division of the Coast Lines, and from Sommerville, Tex., to Beaumont, on the Gulf Lines. The company already has a portion of its road from Kansas City, Mo., to Newton, Kan., operated by telephone despatching. The entire line from Kansas City to Newton will be ready for service very soon. This, with the proposed addition of 1,124 miles, will make a total of 1,350 miles of road that will have telephone train wires.

English Railway Chairman on Electric Traction.

Lord Claud Hamilton, speaking as chairman of the East London Railway, was also expressing the views of other English railway men on the subject of electrification. The conversion of the railway from steam to electric traction has long been recognized as its only possible salvation, but the managers do not recommend it at present because they are awaiting the result of the London, Brighton & South Coast single-phase experiment in South London. Experience therewith might, if it were satisfactory, make matters assume a different shape, but he remarked that unfortunately there was no reason at present to think that it was certain to be satisfactory, because the contract had taken much longer to complete than was anticipated, and it was rumored that the estimates had been greatly exceeded. It remained to be seen whether that line could be worked more cheaply than by the third rail or low-tension direct current. It was too early to tell what were the advantages or disadvantages of the working with single-phase alternating current on the Lancaster & Morecambe line of the Midland company. Lord Claud thought that there must be some good reason why low-tension direct current working had made such tardy progress in England. He suspected that it was that electrical working on that system compared with steam had proved too costly. They had to wait and see whether the Brighton company's experiment was going to show that the single-phase system would be more economical.

Western Canada Railway Club.

A railway club of western Canada has been organized with headquarters in Winnipeg, Man. The following officers have been elected: Hon. President, William Whyte; Hon. Vice-Presidents, M. H. McLeod, G. J. Bury, G. W. Caye and Wilford Phillips; President, Grant Hall; First Vice-President, L. B. Merriman; Secretary, W. H. Roseberry; Treasurer, T. Humphries; Secretary of Committee, E. W. DuVal; Executive Committee, R. J. Hungerford, C. W. Cooper, J. McKenzie, W. Smith, R. McNeil and L. O. Moody. The club will meet on the second Monday of each month, excepting June, July and August.

American Society of Mechanical Engineers.

The next monthly meeting will be held on February 23, the fourth Tuesday of the month instead of the second Tuesday, as usual. Frederic M. Whyte, General Mechanical Engineer of the New York Central Lines, will discuss the principles of the application of safety valves to steam boilers with special reference to locomotive practice, including questions of design and construction and the requirements and limitations of valves. His paper will be followed by a general discussion covering marine and stationary practice and conditions existing in connection with low-pressure heating boilers.

Stevens Institute of Technology.

The alumni of Stevens Institute of Technology will have their annual dinner Feb. 19 at the Hotel Astor, New York. Among the speakers will be President Humphreys, of Stevens Institute; Alfred Noble, who will speak on the Panama Canal; Colonel H. G. Prout; John A. Bensel, Commissioner of the Board of Water Supply of New York City, and Colonel George Harvey.

Central & Western Association of Car Service Officers.

The annual meeting will be held at the Great Northern hotel, Chicago, on February 18.

International Railway General Foremen's Association.

The fifth annual convention of the International Railway General Foremen's Association will be held at the Lexington hotel, Chicago, June 1 to 5, 1909, inclusive.

The meeting in 1908 was the most successful in the history of the association. It is expected that the next meeting will be still better.

On January 1, 1908, the association had a total active membership of 160, and 48 per cent. of the membership attended the convention last June. The membership is now 216. The association has set aside half a day to visit the exhibits that will be made by the Railway Supply Men's Association. Last

year 29 supply houses were represented with exhibits, and it is expected that the representation will be still larger this year. Membership in the Supply Men's Association costs $25 a year, and each concern paying this assessment is entitled to 25 sq. ft. of space free. J. Will Johnson, of the Pyle National Electric Headlight Co., 1427 Monadnock block, Chicago, is Secretary of the Railway Supply Men's Association, and checks in payment of membership fees and for exhibit space should be sent to him.

St. Louis Railway Club.

The February meeting will be held on February 12. W. E. Harkness, a telephone engineer of New York City, will present a paper on Train Despatching by Telephone, furnishing in connection therewith a practical demonstration of selectors and telephones as used in the various offices of railways so equipped.

Canadian Society of Civil Engineers.

A meeting of the Electrical Section was held on February 11. There was a demonstration of the Oscillograph by J. A. Johnson, of the Ontario Power Co., Niagara Falls, N. Y.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass.; May 11-14, 1909; Richmond, Va.
American Association of Demurrage Officers.—A. G. Thomason, Scranton, Pa.; May 11; St. Louis, Mo.
American Institute of Electrical Engineers.—R. W. Pope, 33 West 39th street, New York; second Friday in month; New York.
American Railway Association.—W. F. Allen, 24 Park Pl., New York, May 19, 1909; New York.
American Railway Bridge and Building Association.—S. F. Patterson, B. & M., Concord, N. H.; Oct. 19, 1909; Jacksonville, Fla.
American Railway Engineering and Maint. of Way Assoc.—E. H. Fritch, Monadnock Bldg., Chicago; March 16-18, 1909; Chicago.
American Railway Master Mechanics' Association.—J. W. Taylor, Old Colony Bldg., Chicago; June 16-18, 1909; Atlantic City.
American Society of Civil Engineers.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and Aug.; New York.
American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., N.Y.; 2d Tues. in month; annual, Dec. 7-10; New York.
American Street and Interurban Railway Association.—B. V. Swenson, 29 W. 39th St., New York.
Association of American Railway Accounting Officers.—C. G. Phillips, 143 Dearborn St., Chicago; April 28, 1909; Cincinnati.
Association of Railway Claim Agents.—E. H. Hemus, A., T. & S. F., Topeka, Kan.; last week in May, 1909; Detroit, Mich.
Association of Railway Telegraph Superintendents—P. W. Drew, Wisconsin Central Ry., Chicago; June 23-25, 1909; Detroit.
Association of Transportation and Car Accounting Officers.—G. P. Conard, 24 Park Pl., New York; June 22-23; Montreal.
Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
Canadian Society of Civil Engineers.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.
Central Railway Club.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
Freight Claim Association.—Warren P. Taylor, Rich., Fred. & Pot. R.R., Richmond, Va.; June 16, 1909; Old Point Comfort, Va.
International Master Boiler Makers' Association.—Harry D. Vought, 62 Liberty St., New York; May, 1909; Louisville, Ky.
International Railway Fuel Association.—D. B. Sebastian, La Salle St. Station, Chicago; June, 1909.
International Railway General Foremen's Association.—E. C. Cook, Royal Insurance Bldg., Chicago; June 1-5; Chicago.
Iowa Railway Club.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
Master Car Builders' Association.—J. W. Taylor, Old Colony Bldg., Chicago; June 21-23, 1909; Atlantic City.
New England Railroad Club.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in mnth, ex. June, July, Aug. and Sept.; Boston.
New York Railroad Club.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
North-West Railway Club.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, Aug.; St. Paul and Minn.
Railway Club of Pittsburgh.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June July and August; Pittsburgh.
Railway Signal Association.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; March 15, 1909; Chicago.
Railway Storekeepers' Association.—J. P. Murphy, Box C, Collinwood, Ohio.; May 17-19; Chicago.
Roadmasters' and Maintenance of Way Association.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Nov., 1909; Washington.
St. Lohis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. 2d Friday in month, except June, July and Aug.; St. Louis.
Southern Association of Car Service Officers.—J. H. O'Donnell, Bogalusa, La.; April 15; Atlanta, Ga.
Southern and Southwestern Ry. Club.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.
Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R. R.R., East Buffalo, N. Y.; September, 1909; Denver.
Western Railway Club.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.
Western Society of Engineers.—J. H. Warder, Monadnock Bldg., Chicago; 1st Wednesday, except July and August; Chicago.

Traffic News.

The Rock Island is running experimentally "all-night" suburban passenger trains between Chicago and Blue Island.

A bill has been introduced in the Senate of the state of Washington to reduce passenger fares to 2½ cents a mile.

The Iowa Railway Commission will on February 18 hold a public hearing to consider proposed changes in its freight rates and classifications.

The Pennsylvania and the Baltimore & Ohio are reducing westbound freight rates on import traffic to meet the reduction lately made by the Boston & Maine.

The Traffic Club of Chicago has voted to change its constitution so as to make eligible for membership all railway men above the grade of clerk in the traffic, the operating and the legal departments. The club has under consideration but has not settled, a proposition to have permanent club rooms.

The Transcontinental Freight Bureau is still in session at Chicago hearing protests from shippers against the advances in rates that went into effect on January 1 last. Committees representing almost every commercial interest that ships goods to and from the Pacific coast have appeared to argue against the higher rates.

Newspaper reports about traffic arrangements between the Harriman lines and the Kansas City Southern are exaggerated. These roads recently have made some new through routes and through rates for the handling of freight, but it is stated that they are not materially different from arrangements that the Harriman lines have with a number of their other connections.

The Interstate Commerce Commission will give a hearing at Chicago February 17 to determine whether the Northern Pacific ought not to be required to open the Portland gateway to passengers traveling over the Harriman and other lines from the east to Portland and bound for Seattle and other Puget Sound cities. The Northern Pacific has heretofore refused to make joint routes and through rates with other lines through this gateway.

The New Orleans Board of Trade has adopted resolutions protesting against alleged discrimination in steamship rates against New Orleans and in favor of Galveston. Competitive steamship conditions from the eastern seaboard to Galveston give "the port of Galveston and distributive territory reached by it rates of freight that are gradually throttling New Orleans commerce" and "the transportation lines doing business in Texas are controlled by the Texas State Railroad Commission in such a manner that their rates are so adjusted as practically to exclude New Orleans and Louisiana from that territory." Mercantile interests of the state of Louisiana are appealed to to invite steamship competition.

The Western Classification Committee devoted a large part of its time during its recent meeting at Mobile to the subject of stronger packages for shipments of freight. One proposition that was considered by the committee was to require all second-hand cases in which goods are shipped to be sealed, both to prevent goods from being stolen and to better locate losses. It is estimated that many jobbers ship 90 per cent. of their goods in second-hand cases. A strong delegation of shippers appeared and protested against the proposed rule and consideration of the subject was continued until the next meeting. The shippers' associations will try to have only good boxes used in re-shipping. It was also proposed to require rugs to be boxed. Manufacturers of rugs told the committee that this would be very expensive as rugs constitute about 80 per cent. of their shipments and carpets only 20 per cent., whereas, ten years ago these percentages were reversed. It was also proposed to require such light freight as breakfast foods, crackers, etc., to be shipped in packages made of fiber or pulp board. Shippers also protested against this.

The Interstate Commerce Commission replying to the House resolution calling on the Commission to state what advances

in rates had been made since the passage of the amendments to the Interstate Commerce law in June, 1906, says that it is impossible to give the desired information even approximately. The law requires the railways, when they change a rate, to file the new tariff, but it does not require the railways to explain whether the change is an increase or a decrease. Moreover, the railways can make the maximum car load weigh one thing to-day and another to-morrow, and in other ways manipulate the charges so that it will take endless time, patience and skill to discover just what has been done. Between the periods fixed by the resolution July 1, 1906, and Jan. 15, 1909, there were filed nearly 600,000 tariffs, varying in size from one to 700 pages, making 3,000,000 pages in all. On each page there are on an average 50 rates, making in all during that time 150,000,000 items. To determine what changes have been made it would be necessary to compare these 150,000,000 items with the corresponding items in effect previously. Nor does this take into account the changes that have been made by means of varying the proportional parts of joint rates, nor the difference in carload minima, nor the changes of rates wrought by means of changes in classifications. The Commission, largely out of curiosity, undertook to have a comparison made of the tariffs filed on a single day, aggregating about 2,000 pages of manuscript. Eight clerks were put on the work. At the end of seven days they had not finished. Among the important advances which have been made are those in rates on coal from Pennsylvania, Maryland and West Virginia fields to southeastern territory; on pig iron, cast iron pipe, iron and steel articles, lumber, grain and grain products, packing house products and sugar. Rates have been advanced from Kansas City and St. Louis, and points basing thereon, to Texas points. Also the rates on transcontinental freight, east and westbound.

COURT NEWS.

Joseph M. Hill, Chief Justice of the Supreme Court of Arkansas, has resigned to become Chief Counsel for the state in the litigation now pending in the Federal court over freight and passenger rates.

Judge Lewis, of the United States District Court, on February 1 at Denver, Colo., ruled that the selling of a railway pass is not a violation of the Interstate Commerce Law unless and until somebody uses the pass.

Wilbur Stith, formerly Freight Traffic Manager of the Missouri Pacific and Iron Mountain, pleaded guilty in the Federal court at Little Rock, Ark., on February 6 to having given rebates in 1905 to T. H. Bunch, and was fined $2,500 and costs. Mr. Stith appeared in court and said he had paid the rebates only on the orders of his superiors. He is now Traffic Manager of the Waters-Pierce Oil Company.

The United States Circuit court at New York City has refused to restrain the Interstate Commerce Commission from enforcing its order of June 24, 1908, requiring the New York Central to cease discriminating against the Hecker-Jones-Jewell Co. in rates on wheat. This firm complained that flour milled at interior points was brought to New York for export at rates lower than those charged complainant.

The Fulton Bill, postponing the going into effect of rate increases in the discretion of the Interstate Commerce Commission until their reasonableness shall have been determined by the Commission, has finally been rejected by the Senate committee. The disposition of Senator Fulton's measure has not completely taken the matter out of the official discussions, since Representative Needham, of California, has introduced in the House a bill embodying the same principles.

Supplementary suits have been entered by the government in the Federal court at Portland, Ore., to reinforce the claims made in the suits entered a few weeks since to recover land alleged to have been wrongfully sold by the Southern Pacific and its controlled railways. The main basis of the suits is that the several railway companies, in selling land granted to them by the government, had violated the condition that sales should be made only to actual settlers, in limited amounts, at a fixed price. The total area of land sued for is over 350,000 acres.

Judge Carland, of the Federal District Court at Sioux Falls, S. Dak., issued a temporary injunction on February 3, restraining the enforcement of the 2-cent passenger fare act of South Dakota. The injunction was sought by counsel for the railways within 15 minutes after the act was signed by the Governor. A hearing on the question of making the injunction permanent will be given on March 1. The act contained an emergency clause making it effective immediately. Almost simultaneously with the issuance of the injunction by the Federal court the attorney-general of South Dakota got an alternative writ of mandamus from the Dakota State Supreme Court to compel the railways to comply with the law. The writ is returnable on March 3.

In the United States Circuit Court of Appeals at Chicago on February 3 Judge Grosscup held that the federal safety appliances act applies to all cars, on an interstate road, whether engaged in interstate commerce or not at the particular time when an appliance is defective. Three cases involving alleged violations of the act by the Wabash, the Elgin, Joliet & Eastern and the Belt Railway of Chicago were passed on by the court. In each it was contended that the car with the defective appliance was being used at the time in intrastate commerce and therefore did not come within the act. Judge Seaman dissented in the Wabash and Belt cases. He said he believed that the Belt, which operates entirely within the state of Illinois, was not subject to the act, because it appeared that it was an independent railway which only transferred cars between the terminals of trunk lines in Chicago and had no interest in shipping bills or rates charged nor was it concerned in the ultimate destination and delivery to the consignee.

INTERSTATE COMMERCE COMMISSION.

The rates of the Baltimore & Ohio on phosphate rock shipped from Mount Pleasant and Centerville districts in Tennessee to fertilizer manufacturers in cities in Illinois, Indiana, Ohio, Michigan, New York and Pennsylvania were raised in November, 1907, while the rates south from the same originating points were not raised. The new rates were found unreasonable in themselves and were ordered lowered by the commission.

No Jurisdiction Over All Water Rates.

In the matter of jurisdiction over water carriers. Opinion by Chairman Knapp.

On May 4, 1908, the Commission in Conference Rulings, Bulletin No. 2, decided that where a steamboat line agreed on a joint rate with a rail line for certain passenger and freight traffic, it could not unite with a railway company in making a through route and joint rate on a particular traffic without subjecting all its interstate traffic to the provisions of the law and to the jurisdiction of the Commission. Some time thereafter a large number of water carriers petitioned the Commission to reconsider this ruling.

After full investigation the Commission has come to the conclusion that carriers of interstate commerce by water are subject to the act to regulate commerce only in respect of traffic transported under a common control, management or arrangement with a rail carrier, and in respect of traffic not so transported they are exempt from its provisions. It was accordingly ordered that the administrative ruling in question should be modified to conform to these views.

This construction gives workable effect to every provision of the act and is in harmony with its remedial purposes. It controls the all-rail and the part-rail-and-part-water transportation, which is the subject of "common arrangement," and leaves all other water carriage open to free competition. We do not undertake to say what relations or practices constitute or are evidence of common arrangement, for that question is not now presented. We merely hold that as to transportation which is not under common control, management or arrangement, the act does not apply and the Commission is without jurisdiction.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF DECEMBER, 1908.
(See also issue of February 5.)

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenues (or deficit).	Outside operations. net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans-portation.	General.	Total.					
Ann Arbor	301	$93,413	$36,290	$137,542	$17,927	$19,462	$2,707	$66,654	$3,783	$110,533	$27,009	$2,761	$11,369	$18,401	†$7,080
Bangor & Aroostook	515	164,638	40,723	215,870	42,482	28,514	2,541	70,169	11,328	155,034	60,836	.....	1,500	59,336	67,598
Bessemer & Lake Erie	201	298,680	21,342	325,203	34,094	92,416	8,619	121,227	24,457	280,813	44,390	.....	35,000	9,390	34,536
Boston & Maine	2,242	1,946,669	977,593	3,189,130	316,497	398,172	39,803	1,698,961	102,164	2,555,597	633,533	10,745	157,699	486,579	45,537
Buffalo & Susquehanna	373	185,194	16,295	207,741	29,241	47,562	2,430	82,477	8,200	169,909	37,832	114*	4,000	33,718	26,537
Central of New Jersey	668	1,442,260	327,563	1,871,582	167,332	314,313	23,805	530,768	42,620	1,078,838	792,744	8,648*	Cr.38,361	822,457	27,733
Chesapeake & Ohio	1,896	1,789,848	357,521	2,255,594	210,976	434,808	35,556	656,543	49,962	1,387,845	867,749	8,781	67,100	809,430	306,591
Chicago, Indianapolis & Louisville	616	270,347	103,030	412,018	56,212	75,318	12,643	149,536	15,775	309,484	102,534	.....	21,500	81,034	49,862
Chicago, Lake Shore & Eastern	630	281,672	.....	311,711	24,566	67,234	1,201	109,484	12,192	214,677	97,034	.....	3,000	94,034	72,103
Chicago, Milwaukee & St. Paul	7,516	3,504,360	1,001,814	4,933,892	445,674	637,066	119,101	1,815,340	96,342	3,113,523	1,820,369	10,713	198,567	1,632,515	138,622
Chicago, Rock Island & Pacific	7,461	3,318,615	1,449,269	5,053,504	795,595	655,004	112,104	1,894,852	135,183	3,592,738	1,460,866	11,518*	196,267	1,253,081	132,471
Colorado Midland	338	137,107	23,850	195,317	17,626	28,647	10,257	88,210	5,618	150,358	44,959	955*	4,500	39,504	19,438
Delaware & Hudson	845	1,351,588	183,864	1,564,899	10,308	109,356	18,364	559,195	37,556	734,779	830,120	999*	31,749	797,372	177,700
Delaware, Lackawanna & Western	893	2,073,813	534,661	2,783,493	165,284	377,985	42,072	822,395	53,233	1,460,969	1,322,524	23,402	.....	1,345,926	212,099
Detroit, Toledo & Ironton	438	110,826	14,142	132,740	23,182	21,385	2,309	65,253	3,968	116,097	16,643	321	6,979	9,985	43,438
Duluth, South Shore & Atlantic	593	122,333	77,492	213,228	26,732	31,274	7,995	91,329	6,006	163,336	49,892	63	26,783	23,172	8,232
Fort Worth & Denver City	454	285,811	157,741	461,238	68,524	68,865	6,823	140,202	17,893	302,307	158,931	600	8,867	150,664	†46,403
Galveston, Harrisburg & San Antonio	1,339	689,100	190,754	925,561	118,686	119,780	25,823	347,833	25,061	637,183	288,378	417	Cr.23,944	312,739	127,319
Great Northern	6,899	3,009,456	863,537	4,135,634	586,241	556,675	61,989	1,292,279	79,571	2,576,755	1,558,879	10,072	221,151	1,347,800	†106,350
Hocking Valley	347	359,036	67,465	442,117	40,161	139,380	7,581	160,148	12,210	359,480	82,637	2,718*	18,921	60,998	55,740
Houston & Texas Central	789	393,049	128,637	553,227	80,419	71,294	14,213	206,985	19,798	392,709	160,518	.....	2,467	158,051	†75,623
Long Island	392	205,906	319,122	538,752	67,109	110,713	11,829	299,712	13,963	503,326	35,426	73,357	21,714	87,069	157,990
Minneapolis, St. Paul & S. S. Marie	2,395	623,325	224,227	898,469	75,057	134,159	33,163	292,905	18,858	554,142	344,327	20,248	65,133	299,442	62,189
Nashville, Chattanooga & St. Louis	1,230	624,650	221,140	910,509	134,019	137,166	36,866	331,562	23,358	662,971	247,538	756*	20,000	226,782	32,768
New York, Chicago & St. Louis	556	727,898	119,350	873,353	37,427	63,256	43,219	363,329	13,269	520,500	352,853	1,412*	45,510	305,931	†372,233
New York, New Haven & Hartford	2,004	2,133,221	1,788,122	4,355,090	552,955	548,362	25,476	2,006,250	94,936	3,227,979	1,127,111	112,171	300,000	939,282	†78,503
Norfolk & Southern	582	131,002	56,520	199,646	21,318	21,074	3,776	68,554	13,502	128,224	71,422	1,615*	5,200	64,607	36,465
Northern Pacific	5,681	4,031,339	1,265,889	5,640,601	413,395	664,605	67,510	1,779,536	96,822	3,021,868	2,618,733	97,885	253,827	2,462,791	†319,140
Oregon Short Line	1,456	1,096,951	310,710	1,493,104	65,940	152,564	20,606	298,479	34,787	572,377	920,727	1,274*	55,955	863,498	253,785
Philadelphia & Reading	1,007	3,010,626	499,486	3,647,227	221,667	725,072	27,032	1,090,592	63,404	2,127,767	1,519,460	47,787	61,132	1,506,115	396,012
St. Louis & San Francisco	4,727	2,114,408	840,223	3,170,823	469,842	416,178	63,445	1,072,386	102,344	2,124,194	1,046,629	.....	148,427	898,202	275,999
St. Louis, Brownsville & Mexico	454	74,343	30,869	112,946	15,066	15,421	2,788	43,516	7,058	83,849	29,097	343	13,360	16,080	†1,799
San Pedro, Los Angeles & Salt Lake	1,099	354,079	206,483	601,136	83,070	79,031	23,517	190,060	16,068	391,746	209,390	2,537*	25,796	181,057	122,634
Southern	7,294	3,150,913	1,285,734	4,840,574	552,847	821,980	110,894	1,656,421	160,615	3,302,757	1,537,817	21,243	169,142	1,389,918	594,914
Texas & New Orleans	450	219,880	77,100	318,960	62,822	54,287	7,082	121,353	7,997	253,541	65,419	33*	5,277	60,109	†11,840
Union Pacific	3,309	2,814,976	788,618	3,938,452	262,168	415,223	103,728	1,010,989	169,011	1,961,119	1,977,333	2,451*	112,407	1,862,474	476,589
SIX MONTHS OF FISCAL YEAR.															
Ann Arbor	301	$593,756	$258,907	$912,380	$129,198	$122,147	$18,406	$347,923	$24,099	$641,773	$270,607	$18,224	$68,213	$220,618	†$35,461
Bangor & Aroostook	515	1,012,972	314,738	1,396,382	266,055	163,776	16,831	417,930	61,883	926,475	469,907	.....	9,000	460,907	193,109
Bessemer & Lake Erie	201	3,419,820	175,850	3,627,857	320,611	592,363	35,192	918,161	57,423	1,923,750	1,704,107	.....	55,000	1,649,107	†39,395
Boston & Maine	2,242	11,465,291	7,474,954	20,472,503	2,549,696	2,197,268	241,934	8,957,035	457,363	14,403,296	6,069,207	67,212	859,778	5,276,641	†171,075
Buffalo & Susquehanna	373	1,024,478	110,532	1,172,196	205,065	254,665	15,226	417,318	41,043	933,317	238,879	740*	24,000	214,139	73,356
Central of New Jersey	668	8,231,513	2,256,433	11,092,452	1,119,103	1,845,059	159,054	2,959,645	222,355	6,305,216	4,787,236	293,697	533,989	4,546,944	†619,144
Chesapeake & Ohio	1,896	10,466,418	2,387,152	13,402,921	1,553,487	2,482,370	216,916	3,589,870	253,536	8,096,179	5,306,742	3,652*	399,000	4,904,090	57,301
Chicago, Indianapolis & Louisville	616	1,797,588	719,021	2,767,047	442,888	413,062	75,620	876,028	81,991	1,889,589	877,458	.....	129,000	748,458	†38,733
Chicago, Lake Shore & Eastern	630	1,880,277	.....	2,049,050	170,708	452,563	6,649	639,131	38,919	1,307,970	741,080	.....	18,000	723,080	†99,966
Chicago, Milwaukee & St. Paul	7,516	22,884,057	7,162,550	32,507,799	4,106,104	3,764,780	657,072	10,981,708	528,863	20,038,527	12,469,272	164,784	1,188,855	11,445,201	255,288
Chicago, Rock Island & Pacific	7,461	19,072,348	9,170,710	30,016,508	4,710,304	3,828,326	660,661	10,769,161	755,805	20,724,257	9,292,251	61,424*	1,105,714	8,125,113	162,225
Colorado Midland	338	861,038	214,438	1,229,782	154,898	158,389	58,894	494,490	35,140	901,811	327,971	1,482*	46,500	279,989	†2,302
Delaware & Hudson	845	7,763,047	1,625,034	9,610,577	672,715	970,486	114,465	3,232,116	211,178	5,200,960	4,409,617	408	206,749	4,203,276	†526,007
Delaware, Lackawanna & Western	893	12,589,751	3,580,897	17,226,298	1,824,972	2,180,995	286,681	4,671,430	330,449	9,294,527	7,931,771	135,338	504,000	7,563,109	112,424
Detroit, Toledo & Ironton	438	738,435	88,957	874,580	142,318	183,232	14,626	363,511	27,047	730,734	143,846	97	41,873	102,070	111,507
Duluth, South Shore & Atlantic	593	796,933	502,834	1,383,858	220,320	163,747	55,394	506,838	40,963	987,262	396,596	9,524	101,783	304,337	†67,649
Fort Worth & Denver City	454	16,191,117	936,512	2,670,777	408,055	360,176	45,612	784,409	86,248	1,684,500	986,277	3,808	52,400	937,686	†7,081
Galveston, Harrisburg & San Antonio	1,339	4,010,647	1,064,613	5,331,204	629,451	621,968	126,348	2,076,219	158,731	3,612,717	1,718,487	15,321*	92,686	1,610,480	560,936
Great Northern	6,899	23,175,892	5,997,694	30,805,545	5,312,668	3,356,974	353,281	7,681,408	507,449	17,211,780	13,593,765	146,721	1,248,386	12,492,100	†366,612
Hocking Valley	347	2,894,386	465,303	3,458,169	337,573	809,924	45,520	978,769	71,021	2,242,807	1,215,362	48,075	121,581	1,141,856	83,550
Houston & Texas Central	789	2,391,172	778,535	3,354,300	441,882	428,389	88,602	1,169,992	116,545	2,245,410	1,108,890	.....	55,640	1,053,250	130,613
Long Island	392	1,334,554	2,895,384	4,406,307	512,484	608,388	90,495	1,879,264	105,725	3,196,356	1,209,951	548,648	130,282	1,628,317	400,662
Minneapolis, St. Paul & S. S. Marie	2,395	4,841,982	1,643,008	6,788,103	651,704	716,568	118,575	1,948,500	135,359	3,570,706	3,217,397	167,798	483,159	2,902,036	599,599
Nashville, Chattanooga & St. Louis	1,230	3,831,923	1,339,558	5,544,266	790,608	1,019,248	203,123	1,985,205	136,583	4,134,767	1,409,499	6,653*	120,000	1,282,846	†88,622
New York, Chicago & St. Louis	556	3,764,444	792,532	4,712,437	491,266	424,219	260,467	1,829,071	76,518	3,081,541	1,630,896	4,735*	185,510	1,440,650	†338,728
New York, New Haven & Hartford	2,004	13,200,637	12,010,899	27,650,795	3,473,368	3,252,265	147,726	11,323,206	545,241	18,741,806	8,908,980	680,905	1,717,000	7,872,894	†523,532
Norfolk & Southern	582	717,918	336,307	1,140,518	179,656	127,629	25,517	374,081	92,161	799,044	341,474	598	39,200	302,872	108,955
Northern Pacific	5,681	26,195,355	9,392,493	37,645,175	4,018,520	4,102,267	420,526	10,223,294	518,024	19,282,631	18,362,544	313,651	1,602,447	17,073,748	†164,346
Oregon Short Line	1,456	6,616,876	2,128,165	9,280,067	887,803	798,590	109,907	1,704,339	175,776	3,676,415	5,603,652	2,180	298,048	5,307,784	777,822
Philadelphia & Reading	1,007	15,790,914	3,169,228	19,788,826	1,546,151	3,934,279	216,923	5,933,005	329,536	11,959,894	7,828,932	172,634	365,689	7,635,877	†1,114,997
St. Louis & San Francisco	4,727	12,185,777	4,821,472	18,376,595	2,977,617	2,534,615	374,144	6,234,082	576,116	12,696,574	5,680,021	.....	776,805	4,903,216	†176,421
St. Louis, Brownsville & Mexico	454	362,851	165,554	568,867	98,701	76,042	16,395	211,469	31,538	434,145	134,722	415	28,360	106,777	†1,698
San Pedro, Los Angeles & Salt Lake	1,099	2,062,941	1,211,443	3,496,295	608,305	447,171	138,900	1,139,086	103,963	2,437,425	1,058,870	13,707*	144,024	901,139	230,223
Southern	7,294	17,632,779	7,288,405	27,105,652	3,237,257	4,091,631	600,554	9,289,247	863,947	18,082,636	9,023,016	80,084	959,565	8,143,535	1,908,537
Texas & New Orleans	450	1,308,318	414,307	1,835,624	300,646	261,673	33,238	739,027	49,112	1,383,696	451,928	5,631*	49,845	396,452	30,762
Union Pacific	3,309	18,263,692	5,257,688	25,483,948	2,530,190	2,392,315	494,837	5,628,324	605,331	11,650,997	13,832,951	2,068*	650,720	13,180,163	3,494,434

*Deficit. †Decrease.

Charge for Out-of-Line Service Reasonable.

Celina Mill & Elevator Co. v. St. Louis Southwestern et al. Opinion by Commissioner Harlan.

The direct route from the wheat fields on the line of the St. Louis & San Francisco in Oklahoma to points on the St. Louis Southwestern in Texas is through their junction at Sherman. The complainants flour mill at Celina is 28 miles south of Sherman; the haul of its wheat to Celina and of its flour back to Sherman therefore involves an extra service of 56 miles in order to get the benefit of the through milling-in-transit rate applicable via Sherman. The defendants cannot be required to perform this back haul free of charge and its present tariff rates for back hauls and out-of-line service are not unreasonable.

If the milling-in-transit rates over a through route from the Oklahoma wheat fields to points where the flour is consumed are made available to one milling point not on such through route, by giving it a back haul or out-of-line service at reasonable rates, no reason is perceived why the same opportunity should not be accorded to another milling point, even though more distant from such through route, at rates that are relatively reasonable.

Freight Car Balance and Performance in August, 1908.

Arthur Hale, Chairman of the Committee on Car Efficiency of the American Railway Association, in presenting statistical bulletin No. 38, covering car balance and performance for August, 1908, says:

"The number of surplus cars during this month averaged 267,312 daily, or 12.44 per cent. of the total cars reported by the roads included in this statement. The bad order cars averaged 9.99 per cent., making a total of 22.43 per cent. of the total equipment out of service during the month. Adjusting the averages as in previous statements we secure the following:

	Average miles per day.		Average ton-miles per car per day.		Average earnings per car per day.	
	Inc. surp. cars.	Exc. surp. cars.	Inc. surp. cars.	Exc. surp. cars.	Inc. surp. cars.	Exc. surp. cars.
December, 1907	21.9	23.9	289	316	$1.98	$2.17
January, 1908	20.8	24.9	277	325	1.81	2.17
February, 1908	19.7	23.8	271	328	1.82	2.20
March, 1908	21.2	25.5	290	348	1.95	2.34
April, 1908	19.6	24.5	258	324	1.83	2.29
May, 1908	19.3	24.8	254	329	1.72	2.22
June, 1908	19.6	24.7	276	347	1.88	2.37
July, 1908	20.0	24.8	275	342	1.84	2.26
August, 1908	20.8	25.1	292	354	1.98	2.40

"As will be noted from these averages, the performance was quite satisfactory, the ton miles per car per day and the earnings per car per day showing increases; whether compared on the basis of all cars or only such cars as were in active service during the month. The shop cars, after increasing steadily for eight months, show a slight decrease, reflecting the activity in car repairs which closely followed the reduction in the number of surplus cars. There is a marked improvement in the per cent. of loaded mileage, the figure for August reaching 68.8 per cent., the highest since November, 1907, and only two points below the August, 1907, average. This increase is natural in connection with the outward flow of cars indicated in the car balance figures, which show a continued decrease in the number of cars on their home lines. It is probable, however, that the return to a normal use of foreign equipment will not be brought about until the surplus is practically wiped out or at least quite materially reduced."

The accompanying table shows by groups car balance and performance for August, 1908.

FREIGHT CAR BALANCE AND PERFORMANCE IN AUGUST, 1908.

	New England.	New York, New Jersey, Del., Md., Eastern Pa.	Ohio, Indiana, Mich., Western Pa.	Virginia, W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minnesota.	Montana, Wyo., Neb., Dakotas.	Kansas, Colo., Okla., Ind. T., Mo., Ark.	Texas, Louisiana, N. Mex.	Oregon, Idaho, Nev., Cal., Arizona.	Canadian Lines.	Grand total.
Revenue freight cars owned	72,285	662,643	279,891	134,332	174,813	369,327	15,711	138,322	26,470	113,219	98,343	2,085,356
Average number system cars on line	58,848	494,880	226,389	98,176	131,379	302,914	6,591	106,791	15,936	63,025	81,073	1,586,002
Railroad-owned cars: Av. foreign on line	20,741	136,794	64,249	22,192	31,036	73,567	10,792	33,791	17,351	43,688	14,015	468,216
Total cars on line	79,589	631,674	290,638	120,308	162,415	376,481	17,383	140,582	33,287	106,713	95,088	2,054,218
Excess	7,304	.....	10,747	.....	.....	7,154	1,672	2,260	6,817	.....	.....	.....
Per cent. cars on line to total owned:												
Home	81	75	81	73	75	82	42	77	60	56	83	76
Foreign	29	20	23	17	18	20	69	25	66	38	14	23
All railroads	110	95	104	90	93	102	111	102	126	94	97	99
Private cars on line	2,012	37,067	12,578	2,130	5,804	13,548	1,890	8,016	2,008	6,280	4,032	94,865
Total, all cars on line	81,601	668,741	303,216	122,498	167,719	390,029	19,273	148,598	35,295	112,993	99,120	2,149,083
Per cent. of cars in shop	7.19	11.40	9.91	10.22	10.34	6.39	4.81	16.55	7.06	7.20	9.67	9.99
No. of freight engines owned	1,125	9,776	3,800	2,216	2,570	6,291	440	2,486	684	2,355	2,120	33,863
Av. cars on line per freight engine owned	73	68	80	55	65	60	44	60	52	48	47	63
Total freight-car mileage	37,380,640	428,179,825	171,034,900	69,405,330	104,677,554	264,095,171	28,406,053	83,175,431	26,370,894	97,421,188	67,083,842	1,377,230,848
Average miles per car per day	14.8	20.7	18.2	18.3	20.1	22.0	47.5	18.8	24.1	27.8	22.0	20.8
Per cent. loaded mileage	71.9	65.9	65.2	66.5	68.6	73.4	68.5	70.7	67.9	71.1	73.6	68.8
Ton-miles of freight, inc. Co. freight	377,590,667	6,401,066,033	2,511,852,784	964,282,029	1,385,843,771	2,142,337,619	389,520,163	1,097,840,186	310,357,537	1,359,757,735	820,103,871	17,769,502,395
Average ton-miles, including Co. freight:												
Per car-mile	10.1	14.9	16.0	13.9	13.5	13.4	14.0	13.2	11.9	14.0	12.0	14.1
Per loaded car-mile	14.1	22.7	24.6	20.9	18.3	18.3	20.6	18.8	17.5	19.6	16.7	20.7
Per car per day	149	309	294	254	270	288	691	249	286	389	270	292
Gross freight earnings	$4,464,311	38,834,360	14,806,323	6,203,326	8,811,739	18,875,884	3,084,650	$9,543,278	$3,082,309	$12,619,620	$5,901,713	$126,237,513
Average daily earnings: Per car owned	$1.99	$1.89	$1.71	$1.49	$1.65	$2.14	$6.33	$2.23	$3.76	$3.60	$1.94	$2.04
Per railroad-owned car on line	1.81	1.98	2.20	2.99	3.83	2.00	2.08	1.58	1.63	1.72	2.04	5.16
All cars on line	1.76	1.87	1.64	1.66	1.78	2.13	5.72	2.08	2.82	3.61	1.92	1.98

Private Siding Policy at Chicago.

The City Council of Chicago has passed a resolution to adopt a new policy in dealing with "switch track" ordinances. The situation had grown very unsatisfactory, and, at the suggestion of representatives of the Chicago Association of Commerce, Mayor Busse appointed a commission to investigate the entire subject. The commission made a report and recommendations, and the resolution adopted by the Council provides for the carrying out of these recommendations.

The policy of the Council in the past has been to refer ordinances for tracks to committees of the council repre-

senting the parts of the city where the proposed tracks were to be laid, which led to a good deal of corrupt log-rolling. The city's policy was also criticized upon the ground that there was too much delay in the granting of applications and that the term of the grant, which usually was ten years, was too short to warrant an investment of money in plants. As to compensation, it has been the policy of the city to make an annual charge for the privilege of maintaining and operating a track, the basis being one dollar a foot for the first 50 lineal feet and 50 cents a foot for each additional foot of public space occupied. Since this policy went into effect, 122 track ordinances have been passed and the annual aggregate payment required is $12,228, or about $100 per year per track.

The new policy of handling this matter will be as follows: The Council will create a standing committee on local industries, consisting of seven aldermen from west side wards, five from south side wards and three from north side wards. To this committee will be referred all ordinances for special privileges in public ways or for vacating them. The grant for a track will be for 20 years, subject to revocation by the passage of a repealing ordinance. The compensation will be the same as heretofore.

Railroad Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

C. G. Goodrich has been elected President of the Twin City Rapid Transit, succeeding Thomas Lowry, deceased.

J. R. Cottingham has been appointed Attorney for Western Oklahoma of the Kansas City Southern, with office at Guthrie, Okla.

W. C. Brown has been elected President and E. L. Rossiter Treasurer of the Western Transit Co. and the Rutland Transit Co.

W. C. Brown, President of the New York Central & Hudson River, has been elected President and a director of the Toledo, Canada Southern & Detroit, succeeding W. H. Newman, resigned.

C. B. Hayes, whose resignation as Auditor of the Southern Railway we have previously announced, has been appointed Comptroller of the Mobile & Ohio and of the Southern Railway in Mississippi, with headquarters at Mobile, Ala.

Frank V. Whiting, Chief Claim Agent of the Chicago, Indiana & Southern and the Indiana Harbor Belt, has been appointed General Claim Attorney of the New York Central & Hudson River, with office at New York. F. A. Hruska succeeds Mr. Whiting.

M. M. Stallman has been appointed General Attorney of the Delaware, Lackawanna & Western, with general supervision of legal matters in the state of New Jersey. F. W. Thompson has been appointed General Attorney, with general supervision of legal matters in the state of New York.

On February 1, W. C. Nixon was elected First Vice-President of the Orange & Northwestern. W. H. Stark, Vice-President, was elected Second Vice-President; J. H. Elliott, Vice-President, was elected Third Vice-President; L. E. Stafford, Secretary and Auditor; F. H. Hamilton, Assistant Secretary and Assistant Treasurer; J. W. McCullough, Assistant Auditor, and F. J. and R. C. Duff, General Counsel.

Operating Officers.

F. H. Dever, Superintendent of Terminals of the Houston Belt & Terminal Co., has resigned.

F. C. Runnels, Trainmaster of the Chicago & Alton, at Dwight, Ill., has resigned, effective March 1.

J. B. Chandler has been appointed Superintendent of Dining Car Service of the Chicago, St. Paul, Minneapolis & Omaha, at Minneapolis, Minn.

F. J. Avery, Trainmaster of the Osawatomie division of the Missouri Pacific, at Hoisington, Kan., has been transferred to Coffeyville, Kan., succeeding E. C. Wills, who has been transferred to Hoisington, succeeding J. N. Pemberton, Acting Trainmaster.

Edwin T. Douglass, General Manager of the Western Transit Co. has been elected also General Manager of the Rutland Transit Co., succeeding George T. Jarvis.

F. J. Norris, Trainmaster of the Trinity & Brazos Valley, at Teague, Tex., has been appointed Chief Despatcher of the Chicago, Rock Island & Pacific, at Little Rock, Ark. J. W. Carnes, chief clerk to the Superintendent of the Trinity & Brazos Valley, succeeds Mr. Norris.

J. C. Dailey, General Superintendent of the International & Great Northern, has been appointed General Superintendent of the Denver & Rio Grande, with office at Salt Lake City, Utah, succeeding Ernest Stenger, resigned, and the office of General Superintendent of the former road has been abolished.

The titles of Master Mechanic, Resident Engineer, Trainmaster and Traveling Engineer have been discontinued on the Louisiana division of Morgan's Louisiana & Texas. C. F. Bradshaw, Trainmaster at Lafayette, La., has been appointed Assistant Superintendent; Louis Mims, Resident Engineer at Lafayette, has been appointed Assistant Superintendent; H. M. Norton has been appointed Assistant Superintendent, and G. C. Scarlette remains Assistant Superintendent. (See an article in another part of this issue.)

C. E. Baker has been appointed Passenger Trainmaster in charge of electrified lines of the Long Island Railroad, with office at Flatbush avenue, Brooklyn, N. Y. E. K. Morris, Assistant Passenger Trainmaster at Brooklyn, has been transferred to Long Island City, where he will perform such duties as are assigned to him by the Passenger Trainmaster. A. Broughton, Assistant Trainmaster in charge of station agents, has been appointed Inspector of Station Agents, with office at Long Island City, and his former office has been abolished.

C. E. Grasemann, recently appointed Goods Manager of the London & North Western Railway, has made himself widely known to American railway officers through his visits and studies of methods here. He began as a clerk in the goods department at the Euston headquarters about 30 years ago; served in different London branch offices until he had his chance in the great Broad street station, the busiest and in most respects the most interesting freight station in England. For more than 15 years he has been Outdoor Goods Manager. He is now next in line to the highest position in the corporation, and his training for it has been singular in two respects: It has been entirely in the service of one company and in one department of that company. This is commonly recognized as a limiting feature, a chance to make an uncommonly bigoted manager of narrow views, and yet it is not easy to find in British railway service an officer of broader views, of more keen appreciation of the work of every department than is Mr. Grasemann. This is probably due to the fact that his work has always kept him in direct and daily communication with the public which his company serves. His method of defending the company has been a continuous study of its customers' transportation needs and an undertaking to fulfil them. An editorial under the heading: "Wanted, a diplomatic corps," in these columns, January 29, indicates the kind of work needed on American roads, and which he has been doing successfully: "Discovering the kind of service

C. E. Grasemann.

which the railway was really giving its patrons and the way in which that service could be performed better and existing friction removed." Mr. Grasemann could not have succeeded in qualifying as a general officer, under his limiting conditions, without unusual physical and mental qualities. Only a powerful man with good digestion could have maintained his administrative activities and his continual study of the different departments of the art of transportation.

E. J. Chamberlin, whose appointment as General Manager of the Grand Trunk Pacific has been previously announced, was born in Lancaster, N. H. He received his education at the Montpelier Methodist Seminary, and began railway work in 1871 as timekeeper in the car shops of the Central Vermont at St. Albans, Vt. The next year he was made clerk in the paymaster's office, working as clerk in this office and in the Transportation Superintendent's office for three years. In 1875 he became corresponding secretary for the General Superintendent, and two years later was made private secretary to the General Manager. In April, 1884, he was appointed Superintendent of the Ogdensburg & Lake Champlain and of the Central Vermont line of steamers running from Chicago to Ogdensburg. On September 1, 1886, he was made General Manager of the Canada Atlantic, and in 1905, when the Grand Trunk actually, though not formally, took over the Canada Atlantic, Mr. Chamberlin acted for a year as Manager in the interest of the Grand Trunk. When the formal transfer of the property was made, Mr. Chamberlin went into business as a contractor, and for the last two years and a half has been engaged in contract work for railway construction in Mexico.

E. J. Chamberlin.

Charles W. Jones, whose appointment as General Superintendent of the Chicago, Rock Island & Pacific, with office at Topeka, Kan., has been announced in these columns, was born on November 6, 1860, at Milton, Ind. He received his education in the public schools at Des Moines and Mitchellville, Iowa, and at the Mitchell Seminary, at Mitchellville. He began railway work May 15, 1875, for the Chicago, Rock Island & Pacific and has been in the employ of that road ever since. In 1876 he was a station agent's helper and in 1877 telegraph operator. In 1881 he was made a station agent and operator and in 1884 Train Despatcher. In 1892 he was appointed Trainmaster and in February, 1895, Assistant Superintendent. In August, 1895, he was appointed Superintendent, at Herington, Kan., and in October, 1897, he was made Superintendent of the Eastern division, at Horton, Kan. In May, 1902, he was made Superintendent of the Kansas division, at Topeka, Kan. In August, 1905, he was appointed Superintendent of the Iowa division, at Des Moines, Iowa, which position he held until his recent promotion.

C. W. Jones.

Traffic Officers.

G. A. Perry has been appointed Traveling Tariff Inspector of the Southern at Louisville, Ky.

A. V. Harger has been appointed Traveling Passenger Agent of the Baltimore & Ohio at Chicago.

C. R. Nethercot has been appointed Traveling Freight and Passenger Agent of the Mexican Central at Chicago.

B. C. Tucker, Commercial Agent of the Canadian Pacific at Cleveland, Ohio, has been appointed District Passenger Agent at Cleveland.

G. L. Whitney, Commercial Agent of the Louisiana Railway & Navigation Co., at Dallas, Tex., has been appointed General Agent for Texas.

W. H. Johnson has been appointed Immigration Agent of the White River division of the Missouri Pacific, with office at Springfield, Mo.

On January 1, the traffic officers of the El Paso & Southwestern assumed charge of the Traffic Department of the Morenci Southern.

J. C. Smith, Contracting Freight Agent of the Canadian Pacific, at Pittsburgh, Pa., has been appointed Traveling Freight Agent at Pittsburgh.

H. H. Sparks has been appointed General Live Stock Agent of the Kansas City, Mexico & Orient, with offices at Kansas City, Mo., and Sweetwater, Tex.

M. L. Akers has been appointed General Agent of the Chesapeake & Ohio, at Louisville, Ky., with general supervision over business in Louisville and vicinity.

E. O. Eckhart has been appointed Commercial Agent of the Minneapolis & St. Louis and the Iowa Central, at St. Paul, Minn., succeeding Raymond Kelly, promoted.

W. P. Hinton, General Passenger Agent of the Grand Trunk, has been appointed Assistant Passenger Traffic Manager of the Grand Trunk Pacific, with office at Winnipeg, Man.

C. A. Forrest, Traveling Freight Agent of the St. Louis & San Francisco at Atlanta, Ga., has been appointed Commercial Agent at Chattanooga, Tenn. J. E. Bell succeeds Mr. Forrest.

James R. Hurley, Traveling Passenger Agent of the Lake Shore & Michigan Southern, at Milwaukee, Wis., has been appointed General Agent of the New York Central Lines at Milwaukee.

J. H. Mallory, Commercial Agent of the Illinois Central, at Memphis, Tenn., has been appointed General European Agent, with office at London, England, succeeding Donald Rose, promoted.

F. L. Comstock, General Freight Agent of the Kalamazoo, Lake Shore & Chicago, has resigned to become associated with the Dunkley Williams Co., and the position of General Freight Agent has been abolished.

John J. Carroll, Assistant General Baggage Agent of the Chicago & Western Indiana, has been appointed General Baggage Agent, with office at Chicago, succeeding J. D. Phillips, deceased. John T. Conlon succeeds Mr. Carroll.

D. F. McDonough, Commercial Agent of the St. Louis & San Francisco at Birmingham, Ala., has been appointed Division Freight Agent at Birmingham, succeeding J. C. La Coste, promoted. B. R. Starnes succeeds Mr. McDonough.

Charles M. Wilkinson, Soliciting Freight Agent of the Kansas City Southern, at Houston, Tex., has been appointed Commercial Agent, Freight Department, of the Kansas City Southern and the Texarkana & Ft. Smith, at 423 Navarro street, San Antonio, Tex. This is a new office, opened on February 1. George Riley succeeds Mr. Wilkinson.

H. F. West, Division Freight Agent of the Mohawk district, of the New York Central & Hudson River, at Albany, N. Y., has been appointed Division Freight Agent of the Middle district, with office at Syracuse, N. Y. G. C. Woodruff succeeds

Mr. West. Seneca Kelly has been appointed Traveling Freight Agent of the Middle district, with office at Syracuse.

R. H. Morris, Commercial Agent of the Southern Railway, at Cincinnati, Ohio, has been transferred as Commercial Agent to Chicago, succeeding D. E. Williams, Jr., transferred. H. B. Stafford, Traveling Freight Agent, at Cincinnati, succeeds Mr. Morris. C. C. Woodworth, Traveling Freight Agent, at Nashville, Tenn., succeeds Mr. Stafford, and C. A. Russel succeeds Mr. Woodworth.

Engineering and Rolling Stock Officers.

William Doyle has been appointed Assistant Superintendent of Structures of the Northern Railway, with office at San Jose, Costa Rica.

E. G. Osgood has been appointed Master Mechanic of the Williamsville, Greenville & St. Louis, succeeding O. D. Greenwalt, resigned.

L. H. Long has been appointed Chief Engineer in Charge of Construction of the Cananea, Yaqui River & Pacific, with office at Empalme, Sonora, Mexico.

The jurisdiction of J. P. Nolan, Master Mechanic of Morgan's Louisiana & Texas, has since February 8 been confined to the Algiers shops and Mississippi terminals. (See article in another part of this issue.)

J. C. Garden has been appointed Master Mechanic of the Eastern division of the Grand Trunk, with office at Montreal, succeeding T. McHattie, whose appointment to a position with another company we have previously announced.

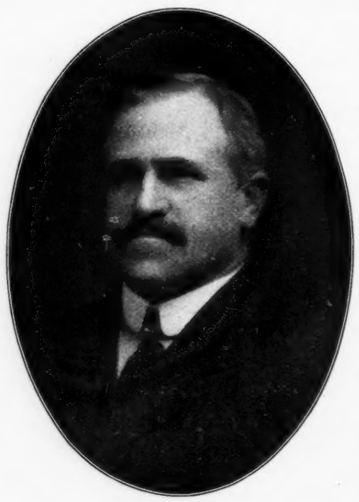
The title of A. J. Himes, Assistant Chief Engineer of the New York, Chicago & St. Louis, has been changed to Engineer of Grade Elimination, and all employees in the engineering department connected with the work of eliminating grade crossings in Cleveland, Ohio; will be under his jurisdiction, and all questions relating to construction work involving train service and requiring action by the engineering department will be referred directly to the Engineer of Grade Elimination.

Charles L. Gaspar, Mechanical Engineer of the Wisconsin Central, has been appointed Superintendent of Motive Power of the Canton-Hankow Railway, China. He sails from San Francisco on February 16. Mr. Gaspar, who is about 32 years old, was born in Waukesha, Wis. He was educated at the University of Wisconsin, and then took a mechanical course in railway engineering at Purdue for two or three years. In the fall of 1899 he went into the Wisconsin Central shops as a special apprentice. He worked through different grades, becoming a machinist in 1902. From 1902 to 1903 he was chief draftsman, and in 1904 was made Mechanical Engineer in charge of the motive power department, reporting to the Superintendent of Motive Power and Cars. The Canton-Hankow at present operates about 40 miles of road, and it is now probable that much more will soon be built, so as to connect with the Pekin-Hankow at Hankow, making a north and south trunk line. The road is equipped with American cars and locomotives, so it is natural that the management should want an American motive power man to take charge of this equipment. Mr. Graham succeeds the late Mr. Reilly, whose work was highly appreciated.

C. L. Gaspar.

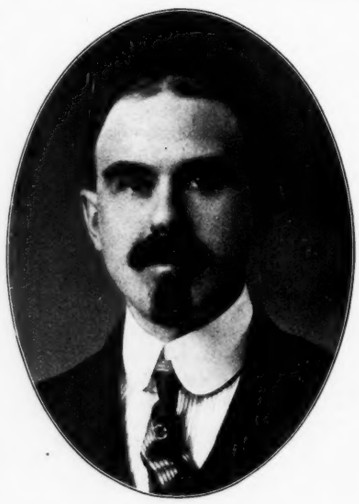
Albert W. Newton, Superintendent of the Creston division of the Chicago, Burlington & Quincy, with office at Creston, Iowa, has been appointed General Inspector of Permanent Way and Structures, with office at Chicago. William A. Card, Assistant Superintendent at Galesburg, Ill., succeeds Mr. Newton.

George P. Smith, whose appointment as Chief Engineer of the Cleveland, Cincinnati, Chicago & St. Louis has been announced in these columns, was born on March 7, 1859, at South Deerfield, Mass. He graduated from the Worcester Institute of Technology, Worcester, Mass., in June, 1885. He began railway work in 1886 as a draftsman for a locating party of the Burlington & Missouri River, now a part of the Chicago, Burlington & Quincy, and continued in the service of that road in various positions in the Engineering Department, including location, construction and maintenance of way, until January 1, 1896, when he became draftsman for the Lassig Bridge Co., Chicago. In June, 1897, he was appointed Chief Engineer of the St. Joseph & Grand Island. In October, 1900, he was made First Assistant Engineer of the Lake Shore & Michigan Southern, and on April 1, 1902, he was appointed Engineer of Maintenance of Way of the Indiana, Illinois & Iowa, now a part of the Chicago, Indiana & Southern. In July, 1905, he was appointed Chief Engineer of the Lake Erie & Western, which position he held until his recent appointment.



G. P. Smith.

Edward Williams Pratt, whose appointment as Assistant Superintendent of Motive Power and Machinery of the Chicago & North Western was recently announced in these columns, was born at Fort Atkinson, Wis., on June 2, 1869. His father, George A. Pratt, was at the time of his death the oldest in point of service of any agent on the Chicago & North Western, and his uncle was the late Dr. William H. Williams, of the Baldwin Locomotive Works. When he was 13 he learned telegraphy in his father's office. He received his education from the public and high schools in his home town and completed the course in Mechanical Engineering at Lehigh University. During his several vacations, he took up field work in civil engineering on the Chicago & North Western and the Elgin, Joliet & Eastern, the latter being under construction. After graduating from Lehigh he entered the employ of the Western Electric Co., Chicago, and a short time later he was appointed Superintendent of the Chicago Hardware Manufacturing Co. In 1892 he again entered the employ of the Chicago & North Western, in the air-brake repair room, and later the same year he was appointed General Air-Brake Inspector. During his more than seven years in that position he was an active member of the Air-Brake and the Traveling Engineers' Associations and was recognized as one of the best authorities on the air-brake. He was one of the first to instruct on the double brake applications for passenger trains and also helped to develop the



E. W. Pratt.

system of progressive examinations for firemen and engimen. On January 1, 1900, he gave up the air-brake work and became Roundhouse Foreman, at Chicago, in order to learn more of the duties of the Mechanical Department. In June, 1900, he was made General Foreman of the Ashland division, at Ashland, Wis. In November, 1901, he was appointed Master Mechanic of the Iowa and Minnesota division, at Mason City, Iowa. In January, 1903, he was appointed Master Mechanic of the Fremont, Elkhorn & Missouri Valley, now a part of the Chicago & North Western. He was also given charge of the car and locomotive departments of the Wyoming & North Western, a subsidiary line in Wyoming.

Louis Charlton Fritch has been appointed Consulting Engineer of the Illinois Central, Indianapolis & Southern and the Yazoo & Mississippi Valley, as previously announced in these columns. He was born in August, 1867, at Springfield, Ill. He was educated at the University of Cincinnati, where he took a course in Civil Engineering and later took a law course and was admitted to the bar in Ohio. He began railway work in 1884 as supervisor's assistant on the Ohio & Mississippi, now a part of the Baltimore & Ohio Southwestern. On January 1, 1886, he was made Assistant Engineer of the Ohio & Mississippi, and in October, 1892, Engineer of Maintenance of Way, succeeding to the position formerly filled by the Chief Engineer and Master of Maintenance of Way. He was also made Chief Engineer of the Cincinnati & Bedford. On November 1, 1893, he was appointed Division Engineer of the Baltimore & Ohio Southwestern, and in September, 1899, Superintendent of the Mississippi division. From February, 1904, to March 1, 1905, he was conducting some special work for the Illinois Central, at Chicago. On March 1, 1905, he was appointed Assistant to the General Manager of the Illinois Central, and in November, 1906, was made Assistant to the President. As Consulting Engineer, Mr. Fritch will have charge of the proposed electrification work at Chicago.

Louis C. Fritch.

Walter William Colpitts, Assistant Chief Engineer of the Kansas City, Mexico & Orient, has been appointed Chief Engineer, succeeding M. P. Paret, resigned. Mr. Colpitts was born September 17, 1874, at Moncton, N. B. He graduated from McGill University, Montreal, in 1899, with the degrees of B.S. and C.E., and in 1901 he received the degree of M.S. from the same university. During his university education he led his class each year and graduated with honors, winning the British Association Gold Medal. He began railway work in 1890 as a draftsman in the office of the Chief Engineer of the Intercolonial of Canada. In 1891 and 1892 he was rodman, levelman and transitman for a surveying corps of the same road, and in 1893 he was appointed Resident Engineer in charge of construction of the train ferry service at Strait of Canso, Nova Scotia. In 1894 and 1895 he was transitman on surveys for branch lines, and in 1896 he was in the office of the Chief Engineer, designing bridges, buildings, etc. In 1897 he was appointed Assistant Engineer of the Murray Harbor branch of the Prince Edward Island Railway. In 1898 he was made Resident Engineer of the Midland Railway of Nova Scotia and in 1899 Chief Clerk in the office of the President of the Canadian Pacific at Montreal. In 1900 he was made Assistant Engineer of the Construction Department of the Canadian Pacific, at Winnipeg, Man. In 1901 he was appointed Assistant Engineer of the Kansas City, Mexico & Orient, and in January, 1902, was made Division Engineer. In December, 1903, he was appointed Assistant Chief Engineer of the same road, this being his position until his recent appointment.

Special Officers.

A. S. Maynard has been appointed Chief Commissary Agent of the Canadian Pacific, with headquarters at Montreal, Que. This is a new department and is for the purpose of facilitating the purchase of supplies for the company's hotels. Assistants will be appointed and will be stationed at St. John, N. B.; Toronto, Ont.; Winnipeg, Man.; Calgary, Alta.; Vancouver and Victoria, B. C.

Purchasing Officers.

A. F. Hull has been appointed Purchasing Agent of the Rock Island-Frisco Lines at Ft. Worth, Tex.

OBITUARY.

Thomas E. Newman, Road Foreman of Engines of the Baltimore & Ohio, died last week.

William Purcell, President and Treasurer of the Coahuila & Zacatecas, died February 5 at San Antonio, Tex.

A. G. Yates, President of the Buffalo, Rochester & Pittsburgh, died of apoplexy at New York on January 12.

Charles P. Adams, Superintendent of Telegraph of the Southern Railway, died at Washington, D. C., February 9.

James A. McLain, General Live Stock Agent of the Cincinnati, Hamilton & Dayton, died of pneumonia on February 1.

William J. Kealey, General Freight and Passenger Agent of the Chicago, Kalamazoo & Saginaw, died on Wednesday, February 3.

John D. Phillips, General Baggage Agent of the Chicago & Western Indiana, died at Chicago on February 2. He was 50 years old.

Railroad Construction.

New Incorporations, Surveys, Etc.

ARKANSAS SOUTHEASTERN.—This company, operating 57 miles of railway from Randolph, La., east and southeast to River Junction, is said to have given contracts to S. R. Neal and N. M. George, of Farmerville, La., to build an extension south to Farmerville, five miles.

CANADIAN PACIFIC.—The Manitoba & Northwestern is applying for an extension of time to build the following lines: From Sheho to Prince Albert, Sask.; extension of the Shell River branch from Russell, Man., to the northern or western boundary of Manitoba; branch line from the main line between Portage la Prairie, Man., and Arden, via the Riding mountains to the northern or western boundary of Manitoba; branch line from a point between Westbourne, Man., and Beautiful Plains, northwesterly in the direction of Lake Dauphin or Duck mountains; branch line from the main line between Theodore, Sask., and Insinger in a westerly and northwesterly direction to a junction with the Quill Lakes branch at Township 32, range 18 or 19, west of the second meridian, about 80 miles; branch line from Bredenbury, Sask., on the main line northerly to Kamsack, about 42 miles.

Construction will be commenced in the spring on the line from Weyburn, Sask., and it is expected that about 25 miles will be completed during the current year. Grading on the gap between Saskatoon, Sask., and Edmonton, Alb., has been completed and track will be laid during the year. An 80-mile line from near Lethbridge, Alb., to join the line between Macleod and Calgary, is also in contemplation. It is intended to build at once to the Little Bow river, a distance of 30 miles. Another line of about 100 miles will be built from Cheadle, Alb., on the main line north to connect with the Lacombe-Stettler extension. Work on this section will be carried only to Ghost Pine creek, about 40 miles, during the present year.

Wm. Whyte, Second Vice-President of this company, is quoted as saying that the company will spend $6,000,000 in

constructing new lines in the West, including those on which work was begun last year. The total mileage to be built will be between 250 and 300 miles.

The Outlook branch of the Western division has been extended from Conan, Sask., northward to Outlook, 28 miles; a new branch called the Broomhill branch has been opened for business on the Central division from Lauder, Man., westward to Tilston, 28 miles.

CENTRAL CALIFORNIA.—See Southern Pacific.

CHAMPLAIN & SANFORD.—Surveys have been completed from Lake Sanford, N. Y., to Riverside for this line, which is to be approximately 58 miles long, to run from Lake Sanford to Schroon Lake, and along the west shore of Schroon Lake to Pottersville, thence through Chester to Raparious on the Adirondack division of the Delaware & Hudson.

CHESAPEAKE & OHIO.—Work is under way at the present time on an extension of the Coal River Ry., from Clothier, Va., to the mouth of Laurel fork along Laurel fork, a distance of five miles; also along Spruce fork for a distance of five miles. G. E. McComas, Contractor, Madison, W. Va.

COAL RIVER RAILWAY.—See Chesapeake & Ohio.

COLORADO & SOUTHERN.—Press reports from Denver, Colo., indicate that between May and September of this year this company will build the proposed extension from Pueblo, Colo., south to Walsenburg, 56 miles, on which grading has been completed. (Nov. 6, p. 1321.)

Press reports from Denver, Colo., indicate that between May 1 and September 1, this company will build the proposed extension from Fort Collins, Colo., north to Cheyenne, Wyo., about 40 miles, surveys for which, it is said, are now being made. (Oct. 23, p. 1226.)

DAYTON, LEBANON & CINCINNATI.—This company, building a steam line from Dayton, Ohio, south to Lebanon, where connection will be made with the Cincinnati, Lebanon & Northern, expects to let contracts within the next 30 days for the line from Lambeth, Ohio, to Dayton, two miles, which has been surveyed. (Nov. 6, p. 1321.)

ELIZABETH & AMBOY TRACTION.—The Traction Development Company was recently incorporated in New Jersey with a capital of $100,000, for the purpose of securing franchises, rights of way and engineering plans for this company. The incorporators include former United States Senator R. F. Pettigrew, R. M. Montgomery, of the East Linden Development Co.; Dr. H. B. Hogeland, W. J. Lansley, of the Hudson & Middlesex Telephone Co.; P. A. Peterson, of Perth Amboy, and C. A. Trimble, of Elizabeth. Actual work on the proposed electric line from Elizabeth to Perth Amboy will probably be started at Linden within the next two months. From Linden the company has a private right of way for several miles. J. A. McClary, of Rahway, N. J., has charge of the rights of way and engineering plans of the company. P. E. Jones, 27 Pine street, New York, is General Counsel.

ERIE.—See Hudson & Manhattan.

FLORIDA EAST COAST.—An officer is quoted as having said that trains will be in operation into Key West within six months, and that the work of laying the concrete road between Knight's Key and Key West is being pushed with all possible speed.

GRAND LAKE & BEND RIVER.—Incorporation is to be asked for in Quebec to build from a point on the Grand Trunk Pacific (National Transcontinental) to Twenty-one-Mile Bay, an arm of the Grand Lake, or to Rabbit lake on the Ottawa river; also a 12-mile branch line. E. B. Devlin, Hull, Que., is solicitor for the applicants.

GULF, COLORADO & SANTA FE.—An officer writes that work is now in progress and will probably be completed in June on the line building from Center, Tex., via Tenaha to Zuber, 21.3 miles. John Scott & Sons, Contractors, St. Louis, Mo. Work of reballasting the Beaumont division from Rayburn, Tex., east, 16 miles, is now in progress. C. F. W. Felt, Chief Engineer, Galveston, Tex. (Aug. 7, p. 693.)

HOLSTON RIVER RAILWAY.—See Virginia & Southwestern.

HUDSON & MANHATTAN.—This company was incorporated in 1906 in New York and New Jersey as a consolidation of the Hoboken & Manhattan Railroad Co., of New Jersey; the New York & Jersey Railroad Co., of New York, and the Hudson & Manhattan Railroad Co., of New York, the new corporation becoming owner of all the tunnels, franchises and properties of the several constituent companies.

The company now owns, and is operating, a double-tube tunnel from Sixth avenue and Twenty-third street, New York, under the Hudson river to the Delaware, Lackawanna & Western passenger station in Hoboken, N. J., a distance of about three miles. The first trains were operated February 26, 1908. The line under Sixth avenue, New York, is being extended from Twenty-third to Thirty-third street. A branch will also be built from Sixth avenue, under Ninth street, to a connection with the subway at Fourth avenue. A double-tube tunnel, which will be the main line of the system, is being built from Hoboken in a southerly direction through the Erie and Pennsylvania stations in Jersey City, and thence under the Hudson river to the Hudson Terminal buildings, Church street, New York. These terminal buildings extend from Cortlandt to Fulton street, two blocks. It is expected that the main line will be in operation about July 1, 1909. The south tube was holed through on January 27, 1909. An extension is to be built from the Pennsylvania station in Jersey City west to connect with the present main line of the Pennsylvania beyond Bergen Hill, and upon its completion, in 1910, trains will be run through between the Hudson Terminal buildings and Newark, N. J., the trains running through the tunnels and over the Pennsylvania's present main line into Newark. The Pennsylvania will maintain ticket offices in the Hudson Terminal buildings and baggage will be checked there for points throughout the entire system. A traffic agreement has been entered into with the Erie.

IOWA & OMAHA SHORT LINE.—An officer writes that the section of this line from Council Bluffs, Iowa, to Traynor, 15 miles, is under contract to George W. Adams & Co., Walnut, Iowa. Grading on the remaining 115 miles will be undertaken this spring. J. H. Mayne, Chief Engineer, Walnut, Iowa.

JOPLIN UNION DEPOT COMPANY.—Capitalized at $500,000 to build and operate a union station in Joplin, Mo. Capital stock is divided into 5,000 shares of par value $100, to be held as follows: W. B. Jansen and Robert Dunlap, of Chicago, one share each; J. A. Edson and S. W. Moore, of Kansas City, Mo., one share each; Charles Gilbert, of St. Louis, one share, and the remaining shares to be divided, in proportions to be hereafter agreed upon, among the Atchison, Topeka & Santa Fe, the Missouri & North Arkansas, and the Kansas City Southern. No work has yet been done as plans are not yet completed. J. A. Edson, President; S. W. Moore, Vice-President and Secretary, and H. Visscher, Treasurer, all of Kansas City, Mo.

KAPITCHOUAN RAILWAY.—Application will be made to the Canadian Parliament for the incorporation of this company, which intends to build a line of railway from a point on the Grand Trunk Pacific near Lake Kapitchouan, Que., in a southeasterly direction to Montreal, with branches about 12 miles long each. G. Desaulnies, Montreal, solicitor.

KANSAS CITY, MEXICO & ORIENT.—Reports from Austin, Tex., indicate that this company has asked the Legislature to enact a special law giving it an extension of five years' time in which to carry out the terms of its charter, which provide for the completion of its line through Texas, including the building of a branch line from San Angelo, Tex., to either Del Rio or Brownsville, on the Rio Grande.

KOKOMO WESTERN TRACTION.—An officer writes that this company, which will build a traction line from Kokomo, Ind., west to Young America, 17 miles, is now ready to receive bids from responsible construction companies. C. C. McFann, President and General Manager, Kokomo, Ind. (Dec. 11, p. 1560.)

LAKE ARTHUR, JENNINGS & NORTHERN.—Incorporated in Louisiana, with $500,000 capital stock to build a road from Lake Arthur, La., north, 10 miles, to Jennings and possibly further north to some point on the Colorado Southern, New Orleans & Pacific. W. D. Conover, President, Lake Arthur.

LAKE ERIE & YOUNGSTOWN (ELECTRIC).—An ordinance was recently passed by the City Council of Youngstown, Ohio, granting permission to this company to build its line into that city. The company was organized to build an electric line from Conneaut, Ohio, south to Youngstown, 60 miles. (Nov. 13, p. 1374.)

LOUISVILLE & ATLANTIC.—A new branch called the Sturgeon Creek branch has been opened for freight service from Heidelburg, Ky., to Ida May.

MANITOBA & NORTHWESTERN.—See Canadian Pacific.

MEXICAN CENTRAL.—A new branch of the Torreon division has been opened for business from San Pedro, Coahuila, to Hornos, 14.3 miles.

MILWAUKEE NORTHERN (ELECTRIC).—An officer writes that this company, which finished work in September on an extension from Cedarburg, Wis., north to Sheboygan, 30 miles, will double-track the line in operation from Milwaukee north to Cedarburg, and build a single-track branch from Cedarburg west to West Bend in 1909. The company's plans call for a line from Milwaukee north to Cedarburg, where it forks, one branch extending north to Sheboygan and the other northwest via West Bend to Fond du Lac, in all 120 miles. (Oct. 16, p. 1177.)

NASHVILLE, FAYETTEVILLE & BIRMINGHAM.—This company is said to have been incorporated in Alabama with $50,000 capital to build a line from Nashville, Tenn., south to Birmingham, Ala., 200 miles. J. C. Diemer, President, and J. M. Robertson, Treasurer. The headquarters of the company are to be at Huntsville, Ala.

NATIONAL LINES OF MEXICO.—Press reports from Durango, Mex., indicate that surveys have been started on the proposed extension of this line from Durango, Dur., southwest to Mazatlan, Sin., on the Pacific coast. This extension will give the National Lines a direct outlet to the Pacific coast and through connections with the International & Great Northern and the Missouri Pacific to Kansas City, Mo. (Jan. 29, p. 236, Mexican Roads.)

NEVADA & CALIFORNIA.—See Southern Pacific.

NEW YORK, AUBURN & LANSING (ELECTRIC).—This road has been extended from Tarbell, N. Y., south to Ithaca, 11.3 miles, and the entire road is now in operation from Auburn, N. Y., to Ithaca, 37 miles. The road is being operated by steam power from Auburn to South Lansing, and electrically operated from South Lansing to Ithaca. The entire road is to be equipped with the third-rail system during the coming summer.

OHIO ROADS (ELECTRIC).—B. B. Putnam and D. A. Bartlett, of Marietta, Ohio, are interested in a project to build electric lines to connect Athens, Ohio, with Nelsonville and Glouster, about 14 miles.

OREGON & WASHINGTON.—According to press reports, a contract has been let for the construction of the Gray's Harbor branch, from Cosmopolis, Wash., on Gray's Harbor, to the main line of the O. & W. Portland-Seattle line, about 40 miles. Work is to be started at once.

PENNSYLVANIA.—See Hudson & Manhattan.

PORTLAND, BAKER CITY & BUTTE ELECTRIC.—Incorporated in Oregon with $2,000,000 capital and headquarters at Portland. The company proposes to build a line from Portland, Ore., east through Clackamas, Wasco, Wheeler and Grant counties to Baker City, Baker county, thence east across Idaho to Butte, Mont., about 500 miles. The incorporators include C. D. Charles, M. W. Gill and H. J. Martin, of Rowe & Martin, all of Portland.

RALEIGH & SOUTHPORT.—Surveys are being made, it is said, for an extension from the present southern terminus to Fayetteville, N. C., south to Hope Mills, five miles.

SACRAMENTO SOUTHERN.—See Southern Pacific.

SOUTHERN PACIFIC.—The annual report of this company for the year ended June 30, 1908, says that during the year there was a net increase in sidings of 153.64 miles. The average number of miles of railway operated for the year was 9,505.81 miles.

On the Nevada & California extension from Keeler, Cal., to Mojave, a distance of about 146 miles, about 36 miles are completed and work on the remaining 110 miles is now in progress.

On the line of the Central California from Niles, Cal., to Red Wood City, a distance of about 16 miles, about seven miles are completed and the grading on the remaining two miles is nearing completion.

On the line of the Sacramento Southern, from Sacramento, Cal., to Antioch, a distance of about 54 miles, about two miles of track and about 10 miles of grading are completed, and work is now in progress on the remainder of the line.

SOUTHERN TRACTION COMPANY.—Plans are said to have been made by this company to build an interurban line from Fort Worth, Tex., south via Burleson and Joshua to Cleburne, about 30 miles. Location surveys to be made soon. Address F. H. Peters and S. P. Hovey, both of Fort Worth.

TEMISKAMING & NORTHERN ONTARIO.—The main line of this road has been extended from Matheson, Ont., northward to Cochrane, 47 miles, and a new branch called the Charlton branch has been opened for business from Englehart, Ont., to Charlton, eight miles.

TENNESSEE NORTHEASTERN.—This company is said to be making surveys for a line to be built from near Winfield, Tenn., on the Cincinnati, New Orleans & Texas Pacific, southwest through Scott, Fentress, Cumberland and White counties, to the Nashville, Chattanooga & St. Louis, near Ravenscroft, about 90 miles. D. L. Fickes, President, and P. C. Chesbrough, Treasurer, both of Scranton, Pa.

TEXAS & GULF.—This road has been opened from Watterman, Tex., to Emmons, 3.6 miles.

VERA CRUZ TERMINAL.—According to press reports work has been started on the large terminal improvements at Vera Cruz, Mex. Contract for the construction of two large custom warehouses, a bonded warehouse, office building, roundhouses and machine shops has been given to S. Pearson & Sons, Ltd., for a union passenger station, coach sheds, tool houses and a concrete viaduct 1,200 ft. long, to the Compania Bancaria de Obras y Bienes Raices of Mexico City. A representative of the latter company is quoted as saying that a reinforced concrete fence about 3,280 ft. long has been built, and work started on the concrete viaduct. The passenger station is to be of reinforced concrete construction, also most of the buildings to be erected by this company. The work will be rushed through to completion, and it is hoped that the Terminal company can occupy the new structures before the expiration of two years allowed by the contract. Track, aggregating 35 miles, is to be laid in freight yards included in the improvements. J. W. Richardson is Chief Engineer. (R. R. G., May 15, p. 688.)

VIRGINIA & SOUTHWESTERN.—An officer is quoted as saying that the Holston River Railway, building a 38-mile line from the V. & S., at Persia, Tenn., south to Moccasin Gap, Va., has about 75 per cent. of the grading finished. Additional contracts to finish the line, it is said, are to be let shortly. (Jan. 1, p. 37.)

VIRGINIAN RAILWAY.—Track has been laid from Altavista, Va., west to Roanoke, and trains are now in operation from Norfolk, Va., west to mile 320.6 at Rich Creek, also from Princeton, W. Va., northwest to Deepwater, W. Va., 101 miles. There remains a gap between Rich Creek and Princeton of about 21 miles yet to be put in operation.

VIRGINIA ROADS.—H. W. Walters, of the Commonwealth Lumber Co., of Pennsylvania, and W. H. Landes, of Staunton, Va., are planning to build a line through timber lands from Christian, Va., west to Deerfield, 20 miles.

WABASH-PITTSBURGH TERMINAL.—An officer for the Receivers of this company writes that the work being carried out includes replacing old timber trestles with steel bridges and viaducts, on concrete masonry in a few cases, and with concrete arches and embankments in the majority of cases. About half a dozen structures were wholly or partially com-

pleted in 1908, and this work is to be finished in 1909. About 75 existing steel bridges are to be repainted in 1909, and the lining of two tunnels with concrete will be finished by the company's forces. Contracts for lining seven tunnels with concrete during 1909 have been let, and the remaining five tunnels will be completed by the company's forces. W. F. Purdy, Chief Engineer, for the Receivers.

Railroad Financial News.

Baltimore & Ohio.—The company has sold $13,000,000 Pittsburgh, Lake Erie & West Virginia system refunding mortgage 4 per cent. bonds of 1901-1941 to Speyer & Co. and Kuhn, Loeb & Co., New York, and Alexander Brown & Co., Baltimore, Md. There was previously outstanding $31,347,000 of these bonds.

Brooklyn Rapid Transit.—An initial dividend of 1 per cent. has been declared on the $45,000,000 capital stock. In declaring the dividend the directors said "that as dividends are declared, they will be made payable on the first days of April, July, October and January. The present declaration of 1 per cent. is not considered as necessarily establishing a 4 per cent. yearly rate.

James M. Wallace, George F. Porter and J. Horace Harding have been elected directors, succeeding the late Anson R. Fowler, H. H. Porter and the late J. C. Jenkins respectively.

Chesapeake & Ohio.—The stockholders have authorized $30,000,000 5 per cent. 20-year general funding and improvement mortgage bonds, of which $11,000,000 bonds have been sold to New York bankers. The proceeds of the bond sale are to be used to fund $7,500,000 6 per cent. collateral notes, due January 1, 1910, and for other capital requirements for additions and extensions.

Chicago & Milwaukee Electric.—The Illinois division bondholders' committee say that sufficient bonds have been deposited to permit the beginning of foreclosure proceedings.

Green Bay & Western.—The directors have declared the regular 5 per cent. dividend on the $2,500,000 stock and on the $600,000 A debentures, and in addition, three-eighths of 1 per cent. on the $7,000,000 B debentures. Five per cent. has been paid yearly on both the stock and the A debentures since 1904. In February, 1908, one-half of 1 per cent. was paid on the B debentures.

Intercolonial Railway.—George P. Graham, Canadian Minister of Railways, in reply to questions in Parliament in regard to the operation of the Intercolonial Railway for the last nine months of 1908, as compared with the corresponding period of 1907, gave the following figures: April-December, 1907, earnings $6,439,174, expenditures $6,061,007, surplus $378,167; April-December, 1908, earnings $5,976,433, expenses $6,313,732, deficit $337,299.

Inter-State Railways.—Edward B. Smith & Co., Philadelphia, Pa., ask the deposit of bonds of the Inter-State Railways with the Philadelphia Trust Safe Deposit & Insurance Co., and say:

"If bonds to the amount of $5,000,000 are deposited, the depositing bondholders are to elect a committee of five, which in conjunction with the firm, are to obtain expert reports upon the physical and financial condition of the several properties and then prepare a plan for the reorganization of the company. This plan is to be submitted at least 60 days before the sale, and dissenting bondholders can then withdraw their bonds upon paying their pro rata share of the expenses, not exceeding 1 per cent. of the bonds deposited. Unless 40 per cent. of the deposited bonds dissent within 30 days, it is then to be binding upon all."

Iowa Central.—Tailer & Co., New York, are offering $400,000 Iowa Central first refunding 4 per cent. bonds of 1901-1951 at 81½. This is part of an authorized issue of $25,000,000, of which there is outstanding $4,970,000.

Lake Shore & Michigan Southern.—E. H. Harriman has been elected a director of this company, succeeding Samuel F. Barger, resigned.

Manistee Northeastern.—The receivers of the Buckley & Douglas Lumber Co. have been authorized to mortgage the property of the Manistee Northeastern to secure an issue of $1,500,000 5 per cent. bonds to be dated January 1, 1909. The proceeds of the sale are to be used to pay debts of Ruggles & Buckley, lumbermen, and the floating debt of the railway, and for the purchase of new equipment and extension of the road. The main line of the road runs from Manistee, Mich., to Traverse City, and the company operates in all about 180 miles.

Michigan Central.—E. H. Harriman has been elected a director of this company, succeeding Samuel F. Barger, resigned.

Minneapolis & St. Louis.—First and refunding mortgage 4 per cent. bonds of 1899-1949, amounting to $1,015,000, are to be issued to retire a like amount of Iowa extension 7 per cent. bonds due June 1, 1909. Of the first and refunding bonds, the New York Stock Exchange has listed $350,000, making the total listed to date $10,855,000.

Missouri Pacific.—Collateral trust convertible 6 per cent. notes, $6,000,000 authorized, dated February 10, 1908, redeemable at the option of the company at 101, have been called for payment on March 12.

National Railways of Mexico.—The board of directors has been increased from seven to 21, and H. Clay Pierce has been elected chairman. The new members of the board are: Jose Yves Limantour, E. N. Brown, Julio M. Limantour, S. M. Felton and Jose Signoret, of Mexico City, and Wm. H. Nichols, H. Clay Pierce, Henry S. Priest, Bradley W. Palmer, Clay Arthur Pierce, Eben Richards, James Speyer, Ernst Thalmann and James N. Wallace, of New York; these last named members to constitute the local board in New York. It is understood that of the local board in New York, Messrs. Speyer, Nichols, Thalmann and Wallace were elected to represent the interests of the Mexican Government.

New Orleans, Fort Jackson & Grand Isle.—An injunction secured by Charles D. Haines some time ago to prevent the New Orleans Southern from holding a controlling interest in the stock of the N. O., F. J. & G. I. has been vacated. A controlling interest in the outstanding $247,000 stock was pledged by Mr. Haines to secure a loan. Arthur Kennedy and associates, having obtained possession of this stock, organized the New Orleans Southern, to which the Grand Isle was leased, prior to October, 1908.

St. Louis, Rocky Mountain & Pacific.—Fisk & Robinson, New York, are offering the unsold portion of the $7,500,000 first mortgage 5 per cent. bonds of 1905-1955 at 95½, yielding 5¼ per cent. The bonds are secured by a first mortgage on 106 miles of standard gage road, connecting the company's coal mines and coke ovens with the Atchison, Topeka & Santa Fe, the Colorado & Southern and the El Paso & Southwestern, and on 299 square miles of coal lands in Colfax county, New Mexico, owned in fee simple, and 513 square miles of coal lands in the same county, wherein coal rights and surface necessary for mining are owned.

Wabash.—The injunction granted in the suit brought by James Pollitz preventing the Wabash from retiring its debenture bonds has been vacated by Judge Ray in the United States Circuit court. The Wabash offered to exchange first refunding and extension mortgage bonds for the $30,000,000 outstanding debenture A and debenture B bonds of 1889-1939. For each debenture A bond, holders received $795 in new 4s and $580 in prefred stock and $580 in common stock, and for each debnture B received $720 in new 4s, $520 in preferred stock and $520 in common stock. All of the debentures except $389,000 of the A and $1,281,000 of the B have been exchanged.

Wisconsin Central.—Under the plan of control of the Wisconsin Central by the Minneapolis, St. Paul & Sault Ste. Marie (itself controlled by the Canadian Pacific) annual dividends of 4 per cent. on the preferred stock of the Wisconsin Central have been guaranteed for 99 years by the Soo, and the preferred stockholders at the same time surrender their rights to share profits with the common stock above 4 per cent.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Chicago, Burlington & Quincy is asking prices on 25 locomotives.

The New York, Chicago & St. Louis is asking prices on 20 locomotives.

The Juragua Iron Co. has ordered one locomotive from the Baldwin Locomotive Works.

The Augusta Southern has ordered one locomotive from the Baldwin Locomotive Works.

The Georgia & Florida has ordered two locomotives from the Baldwin Locomotive Works.

The Gilchrist-Fordney Co. has ordered one locomotive from the Baldwin Locomotive Works.

The Michigan Alkali Co. has ordered one locomotive from the Baldwin Locomotive Works.

The Eddy Manufacturing Co. has ordered one locomotive from the Baldwin Locomotive Works.

The Northwestern of Brazil has ordered three locomotives from the Baldwin Locomotive Works.

The Delaware, Lackawanna & Western has ordered 40 locomotives from the American Locomotive Co.

The Nevada Northern has ordered one locomotive from the American Locomotive Co. to be built at the Brooks Works.

The Minneapolis, St. Paul & Sault Ste. Marie, reported in the *Railroad Age Gazette* of January 22 as asking prices on eight locomotives, has ordered four from the American Locomotive Co., to be built at the Schenectady works.

The Canadian Pacific, reported in the *Railroad Age Gazette* of January 22 and January 29, has ordered 30 Pacific locomotives from the Locomotive & Machine Co., of Montreal. These locomotives will have the following special equipment:

Bell ringer	Little Giant
Boiler lagging	Magnesia and asbestos
Brake beams	Simplex trussed
Brake shoes	Canadian Pacific standard
Couplers	Tower
Driving boxes	Cast steel
Firebox	Otis steel
Headlight	Pyle-National
Injector	Hancock
Journal bearings	Canadian Bronze Co.
Piston and valve rod packings	Lewis & Kunzer
Safety valve	World
Sanding device	Leech, A-10 double
Lubricators	Detroit
Steam gages	Star
Steam heat equipment	Gold
Superheater	Vaughan-Horsey
Tubes	National B and Mannesman
Valve gear	Walschaerts
Wheel centers	Cast steel

CAR BUILDING.

The Rutland Railroad is in the market for six milk cars.

The Chicago, Burlington & Quincy is asking prices on 25 chair cars.

The Chicago Railways Co. is asking prices on 350 pay-as-you-enter cars.

The Chicago & Southern Traction is in the market for two interurban cars.

The Mississippi River & Bonne Terre has ordered 100 fifty-ton freight cars from the American Car & Foundry Co.

The Corvallis & Alsea River, building a logging road in Oregon, expects to ask bids for rolling stock about March 1, 1909.

The Dinwiddie & Gary, building a steam line in Indiana, is in the market for rolling stock. C. J. Hobbs, Chief Engineer, Kersey, Ind.

The Chicago, Milwaukee & St. Paul, reported in the *Railroad Age Gazette* of February 5 as being in the market for a number of passenger cars, is asking prices on 25 coaches, 15 baggage cars, 10 sleeping cars and four dining cars. This is in addition to the two buffet library cars reported in our issue of January 29, contract for which has not yet been placed.

The Chicago, Burlington & Quincy, reported in the *Railroad Age Gazette* of January 15 as in the market for four dining cars and four observation smoking cars, has ordered five dining and four club cars from the Pullman Co. The club cars are to be of a new design.

The Chicago, Rock Island & Pacific was reported in the *Railroad Age Gazette* of November 27 as preparing specifications for 70 passenger cars. The apportionment of these cars was noted in our issue of December 4. Sixty-nine of these cars, which have been ordered from the American Car & Foundry Co., will have all steel exteriors. The one observation car has also been ordered.

The Seaboard Air Line's specifications for the 500 box, 200 phosphate and 50 ballast cars that appeared in the *Railroad Age Gazette* of January 29, should have included Andrews side frames and American Steel Foundries truck bolsters for all the cars, and American Steel Foundries truck and body bolsters for the phosphate cars. The brake-beams and couplers will be of the Simplex type.

The Pennsylvania cars, reported in the *Railroad Age Gazette* of February 5, will have the following dimensions: Cambria Steel Co., 1,000 fifty-ton, center dump coke cars will be 40 ft. 2 in. long, 9 ft. 6 in. wide, 6 ft. 6 in. high, inside measurements, and 43 ft. 11 in. long, 10 ft. 1⅜ in. wide, 11 ft. 2 in. high, over all. The bodies and underframes will be of steel. Pressed Steel Car Co., 500 fifty-ton stock cars will be 35 ft. 11¼ in. long, 8 ft. 5¼ in. wide, 8 ft. ¼ in. high, inside measurements, and 40 ft. 5 in. long, 9 ft. 10 in. wide, 13 ft. 2⅝ in. high, over all. The bodies will be of wood and the underframes of steel. American Car & Foundry Co., 600 fifty-ton gondola cars will be 40 ft. 8 in. long, 8 ft. 9¼ in. wide, 2 ft. 6 in. high, inside measurements, and 44 ft. 11½ in. long, 10 ft. ⅞ in. wide, 6 ft. 10⅜ in. high, over all. The bodies will be of wood and the underframes of steel. Standard Steel Car Co., 100 fifty-ton flat cars will be 40 ft. 2 in. long, 9 ft. 3 in. wide, inside measurements, and 41 ft. 11 in. long, 9 ft. 11½ in. wide, 6 ft. 7⅝ in. high, over all. The bodies will be of wood and the underframes of steel.

IRON AND STEEL.

The Chicago Great Western will be in the market soon for about 5,000 tons of rails.

The Chicago, Milwaukee & St. Paul will be in the market soon for about 40,000 tons of rails.

The Chicago, Rock Island & Pacific has issued specifications for the manufacture of the 28,000 tons of Bessemer rails ordered from the Illinois Steel Co. late last year and is now in the market for 18,000 additional tons.

The Chicago & North Western, reported in the *Railroad Age Gazette* of November 13 as being in the market for 32,000 tons of rails, has ordered 10,000 tons of open-hearth rails from the Indiana Steel Co. to be rolled at Gary, Ind., and has released specifications on 20,000 tons of Bessemer rails ordered last year from the Illinois Steel Co.

The Baltimore & Ohio, reported in the *Railroad Age Gazette* of February 5 as preparing to close contracts for 1909 rail requirements, has ordered 37,000 tons of 90 and 100-lb. rails divided among the following companies: Maryland Steel Company, Bethlehem Steel Company, Carnegie Steel Company, and Illinois Steel Company. These rails are for delivery within 30 days. The B. & O. has also ordered 10,000 kegs of spikes, 5,000 kegs of bolts and a large quantity of angle plates and other track fixings.

RAILROAD STRUCTURES.

BATON ROUGE, LA.—The Texas & Pacific is building a new passenger station at a cost of about $2,500. (Feb. 5, p. 284.)

BIG SPRING, TEX.—The Texas & Pacific has prepared plans

for a new passenger station. An officer writes that although no appropriation has been made for this structure, it is thought it will be built during the next six months. It is to cost $16,000.

HOUSTON, TEX.—The Houston Belt & Terminal Co. has decided to locate its new passenger station at Texas avenue and Crawford street. At a meeting of the directors on January 22, it was decided to prepare plans immediately for the new station and terminal buildings, including two roundhouses. It will probably be two or three months before bids are asked. (June 26, p. 406.)

The Houston Belt & Terminal Co. has retained Warren & Wetmore, of New York, as the architects to design the new union passenger station. (July 26, p. 406.)

LAS VEGAS, NEV.—The San Pedro, Los Angeles & Salt Lake will build machine and repair shops at a cost of about $300,000. Plans are being prepared for shops that will give an initial employment to 400 men. It is expected bids will be asked in about 40 days.

MELVILLE, SASK.—Plans and specifications have been completed for the freight sheds which will be 160 ft. long, and for yards which will contain 25 miles of track.

ST. JOE, IDAHO.—The Chicago, Milwaukee & Puget Sound will let the contracts soon for building two powerhouses to provide power for operating its line by electricity through the Bitter Root mountains. One of the structures will be built at St. Joe and the other on the Missoula river, about half way between Missoula and Taft, Idaho.

SEATTLE, WASH.—The Great Northern expects to begin construction at an early date on a new viaduct over the canal at Twenty-sixth avenue, Northwest.

VERA CRUZ, MEX.—See Vera Cruz Terminal under Railroad Construction.

VICTORIA, B. C.—The Esquimalt & Nanaimo will build a new freight depot and terminal facilities to cost about $150,000.

WINNIPEG, MAN.—Sealed bids will be received by P. Ryan, Secretary of the National Transcontinental Railway Commission, Ottawa, Ont., until March 10, 1909, for all work in the several trades necessary in the erection of terminal shops. Plans and specifications may be seen at the office of Hugh Lumsden, Chief Engineer, Ottawa, or at the office of S. R. Poulin, District Engineer, Winnipeg, Man. A bond of $100,000 must accompany all bids. (April 3, p. 492.)

The Canadian Northern shops will be enlarged this spring.

SIGNALING.

The Delaware, Lackawanna & Western has just put in use at the west end of the tunnel, Jersey City, an electro-pneumatic interlocking plant, taking the place of mechanical interlocking, which has been abandoned on account of the rearrangement of tracks made in connection with the establishment of the new tunnel and additional tracks to the Hoboken terminal. The new machine is in a temporary tower, which will be superseded a year or more hence when the tracks of the New York, Susquehanna & Western have been depressed to go beneath those of the Lackawanna. The machine at present has levers for 39 switches and signals (23 levers) but will then be doubled in capacity. The permanent tower will be of concrete. A new electro-pneumatic machine has recently been installed in a concrete tower at Grove street, Jersey City, and one was this week put in service at Scranton, Pa. This has 35 levers.

"Limited" Refrigeration.

A successful experiment by the Northern Pacific in shipping pre-cooled fruit from Washington to New York in a special refrigerator car having flax fiber insulation and Bohn ice tanks (White Enamel Refrigerator Co., St. Paul, Minn.), was noted in these columns October 30 last, page 1243. Last month an experiment was made with this car in cold weather to see if the insulation would keep the inside temperature from going below 32 deg. On the 9th the car was heated to a temperature of 59 deg. It was then closed, and opened on the following morning; and the temperature was found to be 50 deg. It was again closed without re-heating and on the following morning registered 38 deg. The thermometers were placed about 12 in. above the floor of the car. The outside temperatures for the corresponding periods were 10 deg. below zero on the 9th and 19 deg. below zero on the night of the 10th. A strong northwest wind blew a part of the time. In an ordinary refrigerator car subjected to a similar test the temperature was 32 deg. on the 10th and zero on the 11th. The first named car has six thicknesses or sheets of flax fiber insulation.

South Fork Bridge on the Pennsylvania.

For more than a year the engineering department of the Pennsylvania Railroad has been preparing to widen the South Fork bridge and to add a fourth track on the line between South Fork, Pa., and Conemaugh, about 3.7 miles. As announced recently, bids have been asked. With the completion of the bridge and the four-tracking of the line between South Fork and Conemaugh, the Pennsylvania will have all of its Pittsburgh division between Altoona and Pittsburgh four-tracked, with the exception of 2.10 miles, between Greensburg and Radebaugh. At these points there are two-track tunnels which must be widened before the other two tracks can be added.

A single span stone arch bridge was built over the Conemaugh river on the line of the original Portage Railroad. This bridge was used by the Pennsylvania until June, 1889. When the South Fork dam gave way, causing the Johnstown flood, this bridge with many others was washed away. When it was rebuilt by the company it was made a three-track bridge, with two 60-ft. spans.

Supply Trade News.

L. P. Mercer has been appointed Resident Manager at Chicago of the Parkesburg Iron Co., Parkesburg, Pa.

J. J. Keefe, well known in the pneumatic tool trade, has been appointed a salesman of the Independent Pneumatic Tool Co., Chicago, with headquarters at Chicago.

C. M. Aikman & Co., New York, makers of mohair plush for coach seat covering, have moved their New York office from 91 Fifth avenue to 135 Fifth avenue.

The specifications for the 200 phosphate cars and 500 box cars recently ordered by the Seaboard Air Line call for paint made by the Frazer Paint Co., Detroit, Mich.

The Mason Safety Rail Joint Co., Kansas City, Mo., has been incorporated with $100,000 capital. The incorporators are Ben H. Barr, Smith Baker, Howard L. Mason and others.

The Isthmian Canal Commission is asking bids until February 23 on car wheels, snatch blocks, band saws, valves, tees, gages, hose and nozzles and belting. (Circular No. 492.)

Farlow draft gear, made by the Farlow Draft Gear Co., Baltimore, Md., has been specified on the 750 cars recently ordered by the Seaboard Air Line and the 850 ordered by the Western Maryland.

Seeley Dunn, Manager of the Southern Storage & Demurrage Bureau, at New Orleans, La., has resigned to become Vice-President and General Manager of the International Car Co., New Orleans.

Royal D. Hawley, 911 Crocker building, San Francisco, Cal., has been appointed Pacific Coast Sales Agent of Paul Dickinson, Incorporated, Chicago, for the sale of its smoke jacks, chimneys and ventilators.

The Crane Co., Chicago, has given the general contract for building its new warehouse at Canal and 15th street, Chicago, to the Lanquist & Illsley Co., of Chicago. It will be a fireproof six-story structure, with dimensions 190 ft. x 241 ft. It will cost $500,000.

J. A. Foulks, 29 Broadway, New York, has been appointed Eastern representative of the Indianapolis Switch & Frog Co., Springfield, O., maker of frogs, switches, crossings and special track material for steam and electric railways, industrial, mining and smelter tracks.

The Union Malleable Iron Co., East Moline, Ill., has just completed its seventh melting furnace, putting it into operation on February 8. This involves the employment of from 75 to 100 additional men. Sales of Heald chain, a specialty of the company, have been increasing.

The Long & Allstatter Co., Hamilton, Ohio, has just built for the Pullman Company a large punching and spacing machine, with automatic feed table, which will carry material 75 ft. long. The machine has several features which have never been put on a machine of this kind before.

The S. Flory Manufacturing Co., Bangor, Pa., last week shipped four carloads of hoisting engines to the Atlantic coast. A cableway is to be installed at Norfolk, Va., as soon as the machinery arrives. The company is getting out machinery for another cableway to be installed at Baltimore, Md., for Coleman Brothers, Boston, Mass., contractors.

The Williams Boltless Rail Joint Manufacturing Co. has been organized to make and sell the Williams boltless rail joint, with headquarters at 1202 Great Northern building, Chicago. The officers are: Frank Williams, President; Frank Condren, Vice-President; W. M. Clark, Secretary and Treasurer; Willis D. Williams, General Manager; Emil Meyer, Assistant Manager.

Edward H. Chapin, New York Sales Agent of the National Car Wheel Co., Pittsburgh, Pa., has been elected Vice-President and Director of the company. When the National company was formed, in 1903, Mr. Chapin was Secretary of the Rochester Car Wheel Co., Rochester, N. Y., which was taken over by the National company. At that time he went to New York as Sales Agent for the company, where he has since remained.

The annual convention of officers and branch managers of the Crocker-Wheeler Co., Ampere, N. J., has been in session at Ampere. The managers of the various company branches brought in favorable accounts of the present situation in their respective territories with regard to the market for electrical machinery. Everywhere manufacturers seem to be willing to consider improvements, such as the electrification of their plants or the installation of further electric motors where their plants are already using electric power. The convention dinner, attended by 35 men, took place in New York at the Machinery Club, in the Hudson Terminal buildings, where the company has its New York offices.

The American Specialty Co., Chicago, has contracted with the High Speed Drill Co., of Dubuque, Iowa, to become the exclusive Sales Agent for the Collis flat and flat twisted high-speed drills, comprising machine shop, blacksmith, structural, track drills, ratchet drills, etc. These drills are made with both the common straight shank and taper shank, the latter design permitting a perfect fit to any standard drill. The "Use-'Em-Up" drill socket, which is a well-known product of the American Specialty Co., has been specified for use in the United States Navy, bids having recently been asked for 12 dozen. This, with previous purchases, makes a total of 27 different places this socket is being used by the government.

The January business of the Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa., increased about $250,000 over the December business, while December orders were considerably in excess of those for November, 1908. The outlook in all departments is encouraging. In the railway motor field there is for the first time a decided pressure noticeable, the number of orders on hand for railway motors is now larger than it has been for a year. In addition to the large orders received recently from two of the New York City street railway companies, contracts have been recorded from the Cincinnati Traction Co., the Washington Railway & Light Co., and the Capital Railway Co. of Washington, D. C., the Oil City Railway Co. and the Spokane & Inland Empire Railroad.

The United States Equipment Co., Chicago, was organized last April to rent to contractors, at reasonable rates, any plant needed for carrying out a contract. It took over the plant of McArthur Bros., the railway contractors, as well as that of some other concerns, and has otherwise added to its equipment. The company has $1,000,000 worth of plants distributed over the country, comprising everything needed in building railways, such as tunneling outfits, cableways, air compressor plants, 30 steam shovels, 50 locomotives and several hundred cars of all sizes and descriptions. The home yards and shops are at McCook, Ill., and the offices are at 1207 Fisher building, Chicago. Herbert E. Reagan is President; Samuel J. Mills, Vice-President, and John Everett, Secretary and Treasurer.

The Davis-Bournonville Co., 90 West street, New York, maker of oxy-acetylene welding and cutting apparatus, has engaged W. R. Noxon as General Sales Manager. Mr. Noxon was formerly sales manager for Noxon Bros., Ingersoll, Ont. J. Edward Fennell, formerly with Menzie Company, Toronto, Ont., has gone to the Davis-Bournonville Co. as traveling representative. The company has completed its plant at Marion, N. J. Heretofore the tools have been made at the works of the Davis Acetylene Co., Elkhart, Ind., and the eastern works are designed to supply the increased demand. The government has equipped the Boston Navy Yard with these torches, making the second complete outfit bought for the use of the navy. The Pennsylvania has equipped the Altoona shops with these torches and apparatus, and the plant of the Goldie & McCollough Co., Ltd., Galt, Ont., has been equipped with a complete oxy-acetylene welding and cutting apparatus.

Charles T. Malcolmson has been appointed to a position with the Roberts & Schaefer Co., Chicago, and will have charge of its recently organized Briquetting Department. Mr. Malcolmson was for three years Engineer in charge of the government fuel testing plant at St. Louis, Mo., where he gave special attention to the manufacture and testing of briquetted coals and lignites. These briquets were made from samples collected from every important coal field in the country and were tested in steam boilers and house heating plants, while over 100 road tests were made with locomotives on the principal railways in the United States. When the plant was moved to Norfolk, he continued these investigations, paying special attention to the testing of briquetted coals for navy use. At the conclusion of this work he went to the Rock Island Mining Co. to design, build and operate a briquetting plant at Hartshorne, Okla. His new connection offers added facilities for designing and building this class of structures.

Charles E. Morrill, President of Valentine & Co., Chicago, has just celebrated the fiftieth anniversary of his continued business connection with Valentine & Co., manufacturers of high grade varnishes. Mr. Morrill first entered the employ of Stimson, Valentine & Co., of Boston, Mass., in January, 1859, and has been actively associated with this concern ever since. Shortly after he became connected with the company the firm name was changed to Valentine & Co., and the main offices moved to New York. Mr. Morrill's territory was New England, which was at that time the center of the carriage trade, but in the seventies it shifted west, and in 1878 he came to Chicago and took charge of the western territory. Shortly after coming west, he organized the Lawson Varnish Co., which soon became successful. In May, 1899, the Lawson company was consolidated with Valentine & Co., and in January, 1900, Mr. Morrill was made President of the enlarged corporation. During the years before he was elected President he made several trips abroad and established agencies in several countries. Last month Valentine & Co. presented him with a handsome loving cup inscribed "Charles E. Morrill, from Valentine & Company, 1859-1909." Mr. Morrill's broadmindedness, generosity in all dealings and executive ability have won for him general respect.

C. E. Morrill.

The plant of the Ohio Seamless Tube Co., Shelby, Ohio, will be ready for operation early in March. This company was originally formed in July, 1908, as the Shelby Tube Co., and bought from the United States Steel Corporation the site and ruins of the Shelby Steel Tube Co.'s plant, which had been destroyed by fire a month before. At the same time the new company agreed to change its name to the Ohio Seamless Tube Co. The best experience in tube-making has been brought to bear in the construction and equipment of the new plant. The company will make a specialty of locomotive, marine and stationary boiler tubes, and will also produce specialties for automobile construction and other mechanical uses. There will also be special equipment for turning out the high-grade of material used in government work. The officers are: J. C. Fish, President; G. M. Skiles, First Vice-President; Chas. S. Hook, Second Vice-President; A. C. Morse, General Manager; H. E. Brubaker, Superintendent; Howard Seltzer, Secretary; Jas. A. Brubaker, Treasurer.

TRADE PUBLICATIONS.

Manganese Steel Castings.—The American Brake Shoe & Foundry Co., New York, has just issued a pamphlet containing a list of the high quality manganese steel castings which it manufactures.

Tonopah & Tidewater.—A wall map, 26 in. x 45 in., showing the Tonopah & Tidewater line and tributary country, has just been issued by that company. The map includes the greater portions of Nevada and California.

Atchison, Topeka & Santa Fe.—The California Limited is attractively brought to the attention of the public by a recent pamphlet. The description of the luxurious features of the service on this transcontinental train are accompanied by appropriate drawings.

Electric Pump Governors.—The Westinghouse Traction Brake Co., Pittsburgh, Pa., has just issued instruction pamphlet No. T 5042 on the subject of electric pump governors. This is a standard Westinghouse instruction pamphlet and contains a number of detailed line drawings and half-tones of electric pump governors.

Missouri Pacific-Iron Mountain Lines.—The Traffic Department of the Missouri Pacific and the St. Louis, Iron Mountain & Southern has just issued a 30-page pamphlet containing complete information for a tour through Mexico, including traveler's equipment, railway service, stop overs, points of interest, etc. Over 125 illustrations in colors show a few of the sights to be seen. A copy of the publication may be obtained upon request.

Motor Lubrication.—The Joseph Dixon Crucible Co., Jersey City, N. J., has just issued a 24-page 5-in. x 8-in. booklet entitled "Lubricating the Motor," which deals with the subject of lubrication of automobiles, motor boats and motor cycles. The booklet is divided into chapters which deal with the individual parts of motor mechanism. Cylinders, transmissions, bearings, etc.

Seamless Cold Drawn Steel Tubing.—A pamphlet of the Ohio Seamless Tube Co., Shelby, Ohio, gives a history of the seamless cold-drawn steel tube industry in America. This is a new company which bought the site and ruins of the plant of the Shelby Steel Tube Co., which was destroyed by fire. The new plant is to be ready for operation early in March. The pamphlet also briefly describes the manufacture of seamless cold-drawn steel tubing.

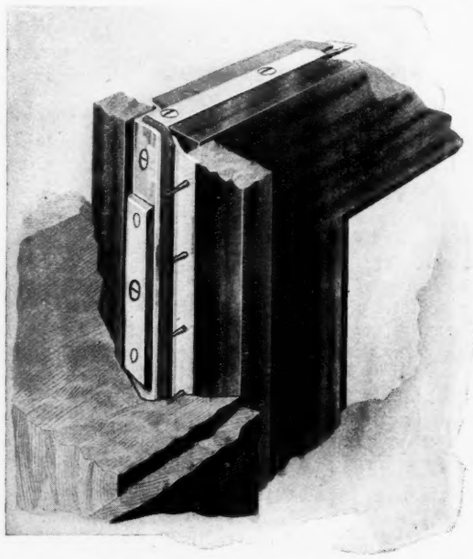
Co-Operation in Contracting.—This is the title of a little pamphlet of the United States Equipment Co., Chicago. This company was organized last year to rent to contractors any plant needed to perform a contract. The purpose of the pamphlet is to show the advantage to contractors of being able to secure plant in this way on short notice without having to increase their plant investment, and making the cost come out of the job itself.

Car Heating and Lighting.—The Gold Car Heating & Lighting Co., New York, has just issued a supplement to catalogue 1905, which contains a complete description of the Gold combination pressure and vapor car heating system. A number of line cuts show positions of the piping and valves for passenger coaches. This system is said to afford an opportunity to heat the car at different temperatures without increasing the manipulation or attention required from trainmen. It is also applicable to the use of hot water. This system was described in the *Railroad Age Gazette* of December 4, 1908.

Producer Gas.—R. D. Wood & Co., Philadelphia, Pa., have just issued a new edition of their catalogue entitled "Gas Producers and Producer Gas Power Plants." This catalogue has been rewritten and newly illustrated, with a number of half-tone and line engravings. It is practically a text book on the subjects of gas producers and producer gas power plants, producers for metallurgical use and various applications of producer gas. It contains a large amount of data and general technical information and is one which should be very useful and instructive to engineering students, as it contains this information in very concise form, similar to the manner in which it is presented in the best technical text books on the subjects.

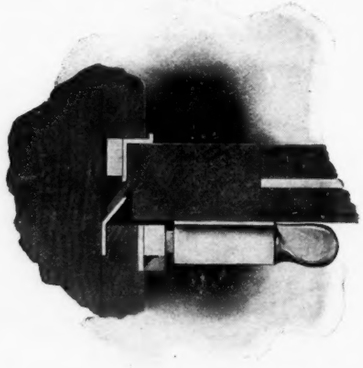
Universal Car Window Fixtures.

A device for applying side weather strips to car windows is shown in the accompanying engravings. It is claimed that it not only keeps out all smoke and dust, but is air tight. The weather strip is held



Universal Side Weather Strip for Car Window.

firmly against a strip of spring brass by a pressed brass angle, which also acts as a dust deflector, centralizes the sash and holds it in equilibrium. Friction is minimized by two 3 in. steel shoes on the edge of the sash, bearing on the window posts. The sash is said to work so easily that sash balances are not necessary, unless the window is extra heavy. As a usual thing it is not the weight of the window that makes it hard to operate, but the wood swelling in damp weather. With these fixtures, besides the flexible weather strips, there are only two points of contact, the two polished steel shoes 3-in. long, which form the runners. At no point does wood touch wood, so that sticking from the above-mentioned cause cannot occur.

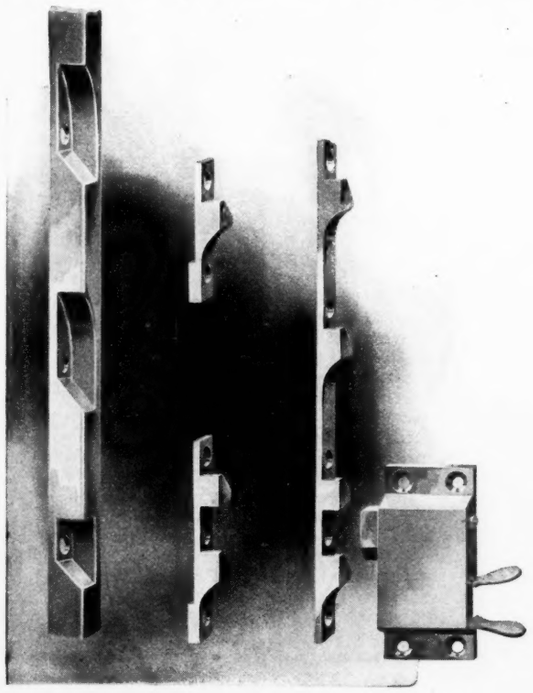


Cross Section Showing Side Weather Strip.

Another device is a gravity wedging lock, to prevent rattling. The lock is beveled 45 deg. and the rack openings are correspondingly beveled downwardly and outwardly, causing the sash to wedge outwardly against the stops, preventing all rattle. On each side of the sash there is always a 3/32-in. space, except when the gravity wedg-

ing bolt forces the sash against the outer brass angle bars, to prevent rattling. As soon as the sash is lifted ¼ in., it centralizes and slides without friction except that due to the rubber weather strip, which is covered (vulcanized) with a heavy linen on the inside, sliding on the brass compression strip. The linen covering also strengthens the rubber weather strip and minimizes friction. The outside part of the rubber weather strip is not covered.

There are various designs of the racks, the pressed form shown



Racks for Gravity Wedging Lock.

being especially neat, as it sets flush with the stop. It costs no more than the ordinary continuous rack. The individual stops have the anti-rattle wedging feature, and are reinforced by extra thickness at the bottom to prevent splitting the wood and pulling out the screws. Channel-holding top and bottom weather strips are also included in these devices. They are called "Universal" window fixtures and are made by the Grip Nut Co., Old Colony building, Chicago.

Steel Sheet Piling for Sea Wall.

Fort St. Philip is on the left bank of the Mississippi River, about 74 miles below New Orleans, 34 miles from the head of the Passes and about 47 miles from the jetty or mouth of the river.

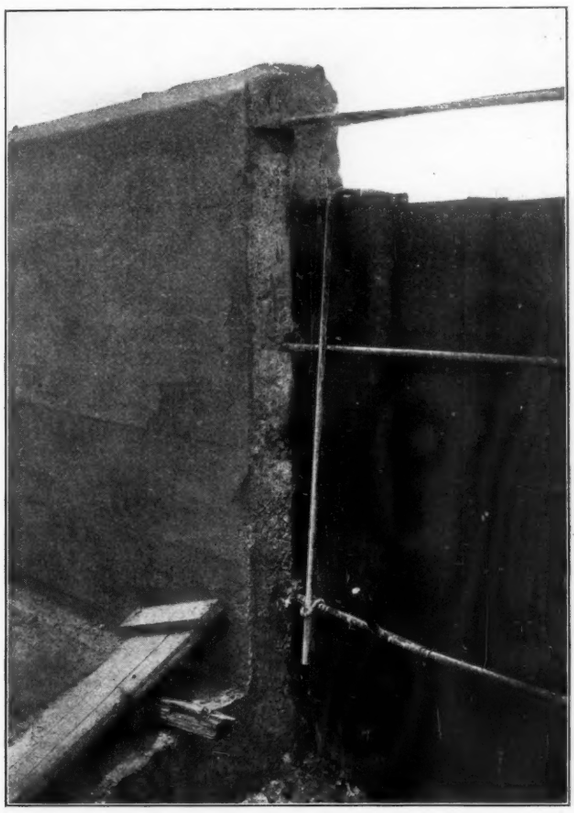
While quite a distance from the mouth of the river, it is only about one mile from Breton Sound, which is an arm of the Gulf of Mexico. The surrounding country is marsh land, frequently flooded

Steel Piling Core.

by the backwater of the Gulf. The river levee gives the Fort ample protection at all times from high water in front, but to protect the Fort on the back, or Gulf side, from the seepage or backwater, which is especially dangerous at high tide, and particularly so at storm tides, it was found desirable to construct a more stable and permanent sea wall than the earth levee. It was accordingly decided by the War Department to convert the levee on the Gulf side into a sea wall by extending it and raising it to a net elevation of 8 ft. above the Gulf level. To prevent seepage of the sea water, the plans called for a reinforcement of the levee with a row of interlocking steel sheet piling with their tops capped by concrete.

The length of the sea wall is 4,400 ft., and the contract involved the enlargement of 3,670 ft. of old levee, the building of 730 ft. of new levee, the driving of 4,400 lineal ft. of steel sheet piling and the placing of the reinforced concrete. The steel piles were 19 ft. long, driven 14 ft. into the levee and extending 5 ft. above its top. The piling was specified to be not less than ⅜ in. thick, to be driven vertically and in straight lines from angle to angle of levee. United States Steel Sheet Piling, 12-in., No. 35, was chosen as being peculiarly fitted for the work in hand, and 4,476 pieces were driven, weighing in all 1,508 net tons.

Work was begun Dec. 1, 1907, and after the enlarged and newly



Detail of Reinforcement.

built levee had settled sufficiently the driving of piling was commenced. The piling was shipped by barge on the river, the first lot arriving in March and the second in May. The piles were driven by a drop hammer weighing 2,800 pounds, with which was used a cushion hood, which prevented any battering of the ends. The drop of the hammer was 10 ft., and the average number of blows was eight. While the soil was almost all silt, several obstructions were encountered in the shape of live oak stumps buried deep underground. Through these the piling was driven without much difficulty. Only one pile driver was used, and new high records in driving steel sheet piling were made: the minimum number of piles driven per 8-hour day was 113, and the maximum 281.

As above mentioned, the object of the steel piling curtain wall was to prevent seepage into the reservation from the Gulf side, and it was, therefore, necessary that this wall be made watertight. Under ordinary conditions United States Steel Sheet Piling can be made practically watertight by wooden packing strips driven with the piling, but in order to avoid all possibility of leakage, the specifications required all piles to be heavily coated with asphaltum pitch and this coating to be thoroughly dry before the piles were driven. After the piles were driven the voids in the interlock were filled with grout composed of three parts of sand and one part of ce-

ment. the result of which was to make an absolutely impervious structure.

The 5 ft. of piling projecting above ground was capped with concrete made in blocks 10 ft. long. Reinforcement was of plain round steel bars, showing an ultimate strength of 60,000 pounds per sq. in., and an elastic limit of not less than one-half the ultimate

Completed Structure; Fort St. Philip Sea Wall.

strength. Vertical and horizontal reinforcing rods were securely fastened with clamps. The cement used was furnished by the Universal Portland Cement Co., Chicago, and the concrete was composed of one part cement, three parts sand and five parts of gravel or broken stone. The concrete forms were so constructed as to give a perfectly smooth surface and no plaster or outside covering was allowed to be applied to the concrete surface after removal of forms.

The contract for the entire sea wall was awarded to Richard M. Murphy, of New Orleans, and the work was executed under the direct supervision of Richard Quinn, assistant engineer, and, after his transfer to Cavite, under the supervision of John L. Dickey, assistant engineer. The steel piling was furnished by the Carnegie Steel Co., Pittsburgh, Pa. The work was finally accepted by the Government on August 1, 1908.

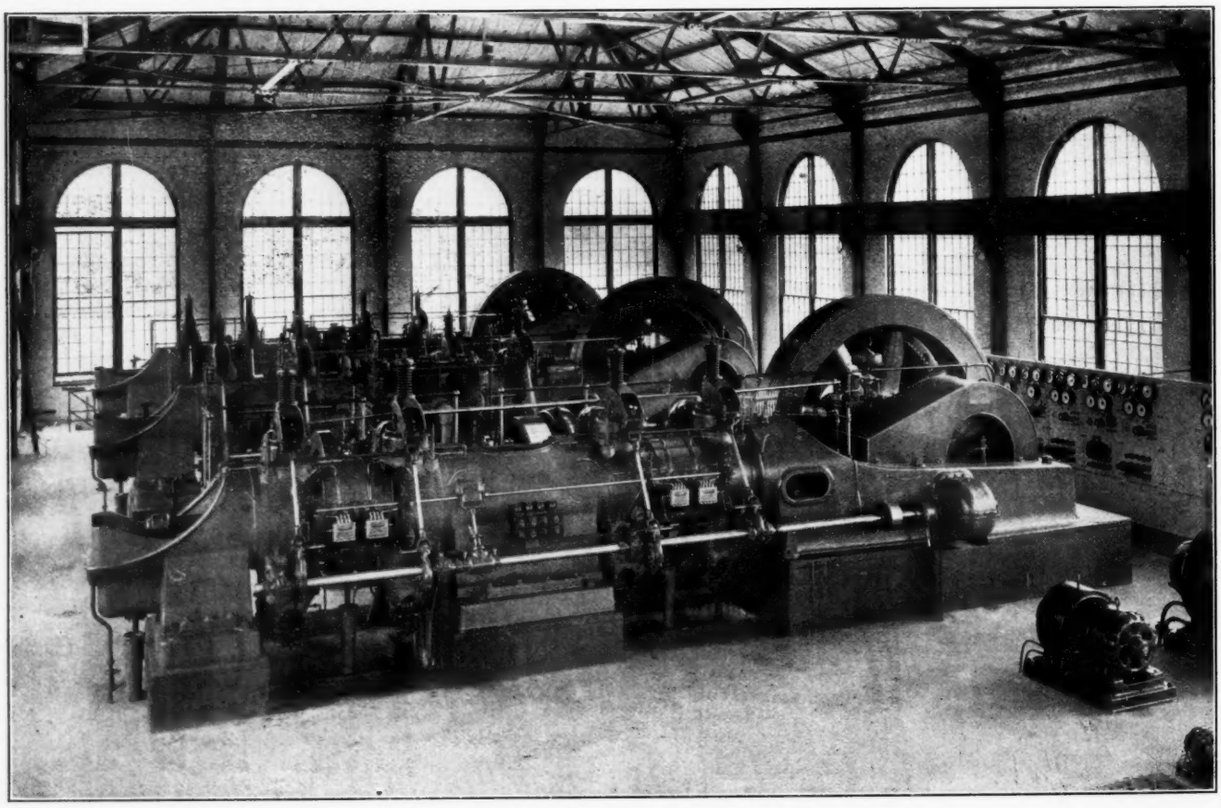
Power House of the Union Switch & Signal Company.

The large addition to the plant of the Union Switch & Signal Co. at Swissvale, Pa., consisting of iron and brass foundries, smith-shop and power house, was illustrated in *The Railway Age*, Jan. 31, 1908, page 170. The power house, which has since been equipped with gas engines and placed in service, is here illustrated by an interior view. It has an engine floor 60 ft.x160 ft., and a basement 60 ft.x160 ft., giving a total area of 19,200 sq. ft.

The equipment includes: Three 350-kw. a.c. generators; three 500-h.p. horizontal gas engines; direct connected; two 75-kw. a. c. generators; two 125-h.p. vertical gas engines, direct connected; one 75-kw. motor generator set (exciter); one 25-kw. motor-generator set for Cooper-Hewitt light; one air compressor for starting gas engines; one 15-ton electric traveling crane, using alternating current; one 12-panel switchboard. A system of gravity lubrication and filtration is used throughout the power house.

An additional foundation for one 500-h.p. engine and generator unit was erected and the power house is large enough to accommodate two more units of the same size; when completed it will be able to deliver 3,250 electrical h.p. All piping and electric wiring inside the building will be placed in the basement and are open for inspection at all times. The cooling water used for the gas engine cylinders is taken from a large cement reservoir containing 450,000 gals., and, after being pumped up to a height of 94 ft., is circulated through the different cylinder jackets back to the reservoir, where the temperature is reduced to about 80 deg. Fahr.

The fuel is natural gas, costing 15 cents per cu. ft. The cost of power at the old plant,—which used vertical engines and natural gas at the same price—including a charge of 4 per cent. of plant valuation for repairs and maintenance, was 0.58 cent per k.w.h.; and, including 5 per cent. interest and taxes 1 per cent., it was 0.71 cent per k.w.h. It is expected that this cost will not be exceeded in the new plant when delivering its full normal load. At present it is lightly loaded and has not been in operation a sufficient length of time to yield a fair average for obtaining actual cost of output.



Power House of Union Switch & Signal Co., Swissvale, Pa.

ANNUAL REPORT

TWENTY-FOURTH ANNUAL REPORT OF THE SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES FOR THE FISCAL YEAR ENDED JUNE 30, 1908.

INCOME FOR THE YEAR.

The gross receipts and disbursements of the Southern Pacific Company in respect of its leased lines and of the Proprietary Companies in respect of lines not leased, and the other receipts and disbursements of the Southern Pacific Company and of such Proprietary Companies, after excluding all offsetting transactions between them, were as follows:

	Year Ended June 30, 1908.	Year Ended. June 30, 1907.
Average miles of all rail lines operated—proprietary and non-proprietary	9,505 61	9,400 59
TRANSPORTATION OPERATIONS.		
Gross operating revenues	$113,545,566 52	$115,630,176 22
Outside operations—revenues	9,731,354 25	10,564,183 91
Total	$123,276,920 77	$126,194,360 13
Operating expenses	$76,005,494 05	$71,135,261 37
Outside operations—expenses	8,657,557 84	9,130,070 74
Taxes (rail lines and properties dealt with as outside operations)	3,950,140 02	2,896,501 03
Total	$88,613,191 91	$83,161,833 14
Revenues over expenses and taxes	$34,663.728 86	$43,032,526 99
INCOME OTHER THAN FROM TRANSPORTATION OPERATIONS.		
Interest on bonds owned of Southern Pacific Co. and of Proprietary Companies	$1,033,881 67	$1,002,712 23
Interest on bonds owned of companies other than Proprietary Companies.	823,958 72	199,070 71
Dividends on stocks owned of companies other than Proprietary Companies	1,081,491 88	778,300 40
Income from lands and securities not pledged for redemption of bonds	729,366 50	715,931 84
Income from sinking funds pledged for redemption of bonds	181,531 85	164,714 44
Balance of interest received on loans and of interest accruing to June 30, on open accounts other than with Proprietary Companies	124,148 61	1,327,423 24
Miscellaneous income	35,101 30	97,431 31
Total	$4,009,480 53	$4,285,584 17
Surplus	$38,673,209 39	$47,318,111 16
FIXED CHARGES.		
Interest on outstanding funded debt of Southern Pacific Co. and Proprietary Companies	$15,868,709 87	$15,991,034 47
Interest on C. P. R. R. Co. 3 per cent. notes to U. S. of America	235,250 88	411,689 04
Sinking fund contributions and income from sinking fund investments	548,531 85	531,714 44
Hire of equipment	874,614 05	1,159,865 04
	$17,527,106 65	$18,094,302 99
Less rentals for lease of road, for joint tracks, yards and other facilities, viz.:		
Collections $745,339 56		
Payments 487,847 18	257,492 38	372,782 72
Total fixed charges	$17,269,614 27	$17,720,520 27
Surplus over fixed charges	$21,403,595 12	$29,597,590 89
OTHER CHARGES.		
Land department expenses	$110,788 64	$158,577 26
Taxes on granted and other lands	233,836 15	206,852 78
Miscellaneous expenses	26,991 72	69,293 56
Taxes and other expenses of Southern Pacific Company	270,098 98	251,050 61
Additions and betterments payable from income of Southern Pacific Company	282,952 06	603,972 14
Reserve for depreciation of rolling stock owned by Southern Pacific Company and leased to other companies	585,454 76	609,251 32
Total other charges	$1,510,122 31	$1,898,997 67
Surplus over fixed and other charges	$19,893,472 81	$27,698,593 22

ASSETS AND LIABILITIES.

The details of the assets and liabilities of the Southern Pacific Company are shown in Table 8. The value of the granted lands belonging to the Central Pacific Railway Company, to the Oregon and California Railroad Company, and to the Southern Pacific Railroad Company, which remained unsold at the close of the year, is not included in the assets of said companies, but the proceeds and all transactions in respect of said lands are shown.

The stocks and bonds owned by the Southern Pacific Company stand charged with $316,565,379.67, an increase during the year of $19,291,573.35. The details of these stocks and bonds (pledged or free) are shown in Tables Nos. 9 and 10.

From Tables Nos. 9 and 10 it will be seen that the Company owns free:

Stocks (par value)	$92,901,889 90
Bonds, (face value)	38,662,300 00
In addition to these stocks and bonds the Company also has free Southern Pacific Company Two-Five Years Four Per Cent. Gold Bonds, not included in any statement of outstanding bonds, to the amount of	22,747,000 00

In addition to the aforementioned free stocks and bonds, the companies have assets also in excess of liabilities amounting to $65,179,908.06, as shown in the following statement, in which the assets and liabilities of the Southern Pacific Company and the Proprietary Companies have been combined and all offsetting accounts excluded.

Current and Deferred Assets.	Total, June 30, 1908.	Increase or *Decrease.*
Cash and cash accounts	$22,911,534 01	$1,288,818 27
Material, fuel and other supplies	15,224,923 18	1,452,352 76
Advances for the construction and acquisition of new lines, including electric lines.	61,146,399 18	21,268,403 08
Terminal real estate and other property.	15,860,787 15	128,175 11
Rolling stock and floating equipment	26,325,398 63	3,995,451 43
Advances for closing Colorado River Crevasse	3,518,152 65	365,232 43
Total Current and Deferred Assets	$144,987,194 80	$28,498,433 08
Current and Deferred Liabilities.		
Cash accounts	$10,769,812 78	*$4,483,428 55*
Interest and dividends	15,356,105 72	1,742,016 68
Loans and bills payable	52,622,648 26	27,932,873 26
Deferred liabilities	1,058,719 98	*$88,085 01*
Total Current and Deferred Liabilities	$79,807,286 74	$24,803,376 38
Assets in excess of liabilities	$65,179,908 06	$3,695,056 70
Contingent assets	$4,520,704 94	$182,397 32

STOCKS AND BONDS OF SOUTHERN PACIFIC COMPANY AND OF PROPRIETARY COMPANIES, OUTSTANDING AT THE CLOSE OF THE YEAR.

	Common Stock.	Preferred Stock.	Bonds and other fixed interest bearing obligations.
Stocks and bonds of Southern Pacific Company	$197,849,258 64	$74,866,463 00	$39,457,500 00
Deduction: Deposited under S. P. Co. 2-5 years 4 per cent. mortgage	.....	.....	$1,000,000 00
Free in treasury	$82,153 34	$106,598 00	649,000 00
Held by Sinking Fund for redemption of bonds	.....	.....	1,786,000 00
Total deduction	$82,153 34	$106,598 00	$3,435,000 00
Amount outstanding in the hands of the Public this year	$197,767,105 30	$74,759,865 00	$36,022,500 00
Amount outstanding in the hands of the Public last year	197,777,105 30	55,637,055 25	36,022,500 00
Stocks and bonds of Proprietary Companies	$309,816,272 00	$25,600,000 00	$344,498,121 10
Deduction: Deposited against issue of Southern Pacific Company common stock and bonds	$275,904,333 00	$25,580,000 00	$10,850,000 00
Owned by Southern Pacific Company free	33,497,065 50	11,000 00	21,428,000 00
Owned by Proprietary Companies	349,50 00	.....	388.000 00
Held by Sinking Funds for redemption of bonds	.....	.....	11,503,000 00
Total deduction	$309,750,898 50	$25,591,000 00	$44,169,000 00
Amount outstanding in the hands of the Public this year	$65,373 50	$9,000 00	$300,329,121 10
Amount outstanding in the hands of the Public last year	65,273 50	9,000 00	304,742,551 89
Total stocks and bonds of Southern Pacific Company and of Proprietary Companies outstanding in the hands of the Public	$197,832,478 80	$74,768,865 00	$336,351,621 10
Total last year	197,842,378 80	55,646,055 25	340,765,051 89
Increase	.....	$19,122,809 75	.....
Decrease	$9,900 00	.....	$4,413,430 79

		Total, June 30, 1908.	Increase or *Decrease.*
Contingent liabilities, viz:			
Insurance, replacement & depreciation funds provided for by deductions from revenues and by charges to operating expenses	$4,960,196 30		
Reserve funds for replacement and depreciation of floating equipment and rolling stock	7,749,574 19		
Principal of deferred payments on land contracts	483,416 08		
Unadjusted claims and accounts	3,000,711 42		
		16,193,897 99	*2,379,586 17*

Under the classification of Operating Revenues and Operating Expenses promulgated by the Interstate Commerce Commission in effect since July 1, 1907, the reserve funds established in former years for maintenance and renewals are not available for the payment of extraordinary repairs and renewals growing out of damages by floods and other exceptional causes. Therefore, the sum to the credit of this reserve fund, amounting to $4,178,641.97, was written off and credited to Profit and Loss.

The Southern Pacific Company advances to the Proprietary Companies the funds required by them for the construction of extensions, for additions, betterments, and equipment, and for terminal properties; also for the construction of new lines and for the acquisition of properties important in the development of the business of the respective companies or in the economical operation of their properties. During the progress of the work the sums thus furnished are carried by the Southern Pacific Company until it is deemed well to dispose of the securities received in payment for such construction, equipment, or other property. Such advances and expenditures amounted, on June 30, 1908, to $103,332,584.96. Of this sum, $61,146,399.18 was for the construction and acquisition of new lines (including electric lines); $15,860,787.15 for terminal real estate and other property, and $26,325,398.63 for rolling stock and floating equipment.

The Company is building railways in the Republic of Mexico under concessions and subventions which make it important that the work should be prosecuted without interruption. The sums required in temporarily financing the Company's expenditures for this and other important work under way were in part secured from the Union Pacific Railroad Company. The sums thus obtained amounted, on June 30, 1908, to $45,376,389.27, of which $20,200,010.00 has since been repaid.

The opening for business, on December 8, 1907, of the Bay Shore Railway afforded a much-needed relief at San Francisco in the handling of trains and traffic. The old line, via Ocean View, built in 1863, traverses what is now a thickly settled part of San Francisco. It is a single track line of heavy grades and curvatures, and its facilities are wholly inadequate for the present traffic of the Company. The new line, of low grades, built on land adjacent to San Francisco Bay, is 11.04 miles in length. Although it is at present only double tracked the entire distance, yet the right of way, the grading, and the bridging are arranged for a four-track main line. The tunnels, five in number, aggregating 9,948 ft. in length (1.884 miles), are double tracked, are masonry lined, with brick arch and concrete side walls and invert. The portals are of concrete, brick faced and trimmed with sandstone. A duplicate of tunnel No. 2 (1,086.4 ft. in length) is now building to the west of the present tunnel to afford four main tracks. The differences between the new and old lines are as follows:

	New line.	Old line.	Saving by new line.
Length (miles)	11.04	13.69	2.65
Maximum grade per mile (feet)	15.84	158.00	142.16
Highest point of grade above San Francisco City base (feet)	20.3	292.0	271.7
Curvature (degrees)	203.46	795.72	592.26

At Visitacion and adjacent thereto, the Company has reclaimed about 195 acres of land. In addition to the filling by dredging, 2,023,323 cubic yards of material (principally rock excavated in this vicinity) was used. At Visitacion there is in course of erection an engine house of 40 stalls, a concrete transfer pit, 494 x 70 feet, a machine shop, 446 x 130 feet, a planing mill and car repair shop 335 x 185 feet, a freight car repair shop, 440 x 115 feet, a storehouse, 103 x 52 feet, a power house, 87 x 50 feet, and other buildings and appurtenances. All these buildings will be of the most substantial character and equipped with machinery and appliances of the best designs for doing work economically. Classification yards and sidings have been built or are in progress of construction, aggregating about 58 miles in length when completed. Two and one-half miles of trestle were built for the purpose of carrying trains to dump filling material for the line across the arm of San Francisco Bay.

In order to secure the desired right of way and terminals, it became necessary to purchase real estate considerably in excess of that actually needed, but only so much thereof as was needed has been charged to the cost of the line, and the remainder is carried under Real Estate. Including the charge for real estate, the sum of $8,676,586.81 was expended to June 30, 1908. for the construction of this line, for terminals, and for shops at Visitacion.

Under the concession of August 14, 1905, referred to in the Annual Report for that year, for the construction of certain lines in the Republic of Mexico, 400.61 kilometers (248.93 miles), were completed by June 30, 1908, of which 354.24 Kilometers (220.12 miles) were in operation. There remain to be built by November, 1912, about 772 kilometers (480 miles) of additional railway. Under this concession the Company receives a subsidy of 12,500 pesos per kilometer (20,116 pesos per mile), payable in Five Per Cent. National Redeemable Debt Bonds of the Republic of Mexico "up to the amount of five million pesos; and these being exhausted the rest of the subvention will be paid in cash, which the Company will receive in ten annual payments without cause of profit, the first payment to be made six months after the respective line which causes the subvention has been constructed and approved by the Secretary of Communications and Public Works." Since the close of the year, the Company has received on this account bonds to the amount of 3,000,000 pesos.

The concession of the Cananea, Yaqui River, and Pacific Railroad Company authorizes the construction (without subvention however), of about 1,257 kilometers (781 miles) of railway. There were completed to June 30, 1908, 455.72 kilometers (283.18 miles), of which 378.98 kilometers (235.49 miles) were in operation, and about 801 kilometers (498 miles) remain to be built by May, 1914.

These concessions aggregate about 2,430 kilometers (1,510 miles) of railway, of which 856.33 kilometers (532.11 miles) were completed by June 30, 1908, leaving about 1,574 kilometers (978 miles) to be built.

CAPITAL EXPENDITURES.

The expenditures by the Proprietary Companies for the construction of new lines, for equipment, and for additions and betterments to completed lines charged to capital account, were as follows:

Expenditures for new lines, viz.:		
Central Pacific Railway:		
Change of line, Palisade, Nev.		$111,994 90
Galveston, Harrisburg and San Antonio Railway:		
Extension from Stockdale to Cuero	$2,216 66	
Additional cost of Galveston, Houston and Northern Railroad purchase in 1905	100,000.00	
		102,216 66
Houston and Texas Central Railroad:		
Extension from Mexia to Nelleva		133,455 59
Louisiana Western Railroad:		
Extension from Eunice to Mamou		2,341 17
Morgan's Louisiana & Texas Railroad & Steamship Co.:		
Extension from Lafayette to Port Allen	$473,030.17	
Extension from Arnaudville to Port Barre	14,748 87	
Extension from Bayou Sale to South Bend	48,474 55	
		536,253 59
Nevada and California Railroad:		
Liabilities assumed in purchase of the Fallon Railway		23,712 13
Oregon and California Railroad:		
Extension from Henderson to Springfield		4,439 16
Southern Pacific Railroad:		
Change in line, Salton Desert		160,886 68
Texas and New Orleans Railroad:		
Extension to Port Arthur	$48,985 44	
Surveys	3,523 72	
		52,509 16
Expenditures for Additions and Betterments viz.:		
Ballast	$125,367 63	
Bridges, trestles and culverts	536,142 78	
Changes in line	232,943 09	
Changes in gauge	78,783 37	
Fencing right of way	7,767 67	
Highway crossing signals	2,313 65	
Interlocking and block signals	722,697 07	
Main tracks	360,247 25	
Over and under grade crossings	101,988 38	
Revision of grades	4,511 36	
Real estate	1,119 85	
Right of way and grounds	239,989 50	
Sidings and passing tracks	1,353,192 84	
Telegraph and telephone lines	134,002 98	
Tunnels	210,688 83	
Widening embankments	159,999 10	
Docks and wharves	265,030 52	
Engine houses, shops and appurtenances	296,878 20	
Fuel and water stations and appurtenances	293,423 56	
Station buildings	258,116 76	
Terminal buildings and yards	296,712 09	
Other buildings and appurtenances	353,740 34	
Two locomotives, 14 passenger cars, 1 pay car, 642 freight cars, 1 fire tug, and 1 launch	894,715 78	
Floating equipment in course of construction	108,922 32	
Additional cost of equipment added during preceding fiscal year	1,609 78	
Additions and improvements to existing equipment	32,374.51	
Total	$7,073,279.21	
Less credits	516,016.43	
		$6,557,262 78
Less expenditures paid from income of Southern Pacific Company, viz.:		
Southern Pacific Coast Railway	$224,332 24	
New Mexico & Arizona Railroad	56,544.31	
Sonora Railway	2,075 51	
		282,952 06
		$6,274,310 72
		$7,402,119 76
Deductions:		
Proceeds from sale of real estate		$29,701.30
Proceeds from sale of rock and other property		8,841 73
Miscellaneous collections		19,007.63
Material recovered from track abandoned		26,065 43
Cost of surveys written off and other adjustments		5,621 25
		$89,237 34
Net expenditures for capital account of Proprietary Cos		$7,312,882.42

CHANGES IN EQUIPMENT DURING THE YEAR.

	Condemned, destroyed, sold or transferred & credited to Replacement Accounts.	Added and charged to Replacement Accounts.	Capital Account.	Free Assets So. Pacific Co.	Total.
Locomotives	29	27	—	117	144
Baggage cars	6	7	—	*5	2
Baggage and mail cars	3	6	—	—	6
Baggage and passenger cars	4	4	—	—	4
Baggage, mail and passenger cars	1	—	—	—	—
Business cars	3	3	—	—	3
Composite	8	—	—	—	—
Dining cars	3	—	—	—	—
Instruction	—	—	2	—	2
Observation cars	—	1	—	1	2
Passenger cars	23	29	10	65	104
Postal cars	2	—	—	2	2
Narrow-gauge passenger-train cars	25	4	—	—	4
Box cars	1,335	370	480	904	1,754
Caboose cars	8	70	—	*20	50
Flat cars	977	662	162	36	860
Fruit cars	18	—	—	—	—
Furniture cars	5	—	—	†4	†4
Gondola cars	136	1	—	†2	†1
Gondola cars (Hopper bottom)	188	1	—	—	1
Refrigerator cars	2	1	—	†2	†1
Stock cars	76	—	—	†7	†7
Tank cars	5	184	—	25	209
Narrow-gauge freight-train cars	60	20	—	—	20
Work equipment	183	535	—	8	543
Amount credited or charged	$2,222,470 73	$1,850,216 13	$824,634 33	$3,345,545 31	$6,020,395 77

*Sold by Southern Pacific Company to Proprietary Companies. †Credit.

The locomotives added during the year average 98.48 tons total weight of engine without tender, and 84.39 tons upon drivers. The freight cars added during the year averaged 50 tons capacity.

There remained to the credit of the funds for replacement of rolling stock at the close of the year, $1,011,324.63.

The locomotives and cars owned, and their capacity at the close of the year were as follows:

	This year.	Last year.	Increase, or *Dec.*	Per cent.
Locomotives, standard gauge	1,858	1,738	120	6.90
Locomotives, narrow gauge	16	21	*5*	23.81
Total	1,874	1,759	115	6.54
(Standard Gauge.)				
Weight:				
Total, excluding tender, tons	132,147	129,128	12,019	10.01
Ave. total, excluding tenders, tons	71.12	69.12	2.00	2.89
Total, on drivers, tons	108,588	98,371	10,217	10.39
Ave. total, on drivers, tons	58.44	56.60	1.84	3.25
Passenger-train cars, stand. gauge.	1,722	1,650	72	4.36
Passenger-train cars, narrow gauge	36	57	*21*	36.84
Total	1,758	1,707	51	2.99
Freight-train cars, standard gauge	43,411	43,300	111	0.26
Freight-train cars, narrow gauge	417	457	*40*	8.75
Total	43,828	43,757	71	0.16
Total capacity, stand. gauge cars, tons	1,532,194	1,475,704	56,490	3.83
Av. capacity, stand. gauge cars, tons	35.90	34.63	1.27	3.67
Work equipment, standard gauge	4,850	4,468	382	8.55
Work equipment, narrow gauge	27	49	*27*	44.90
Total	4,877	4,517	360	7.97

NOTE.—Decreases shown in *italics.*

TRANSPORTATION OPERATIONS.

For the purpose of comparison, the revenues and expenses of this year are restated in the following tables under the classification in effect last year, deducting, however, from the expenses of last year, such expenses as were then included in operating expenses but which are this year charged to income account, also adjusting last year's expenses to the primary accounts of this year's classification as far as practicable.

Thus restated the results of the year's transportation operations compared with those of the preceding year are as follows:

	This year.	Last year.	Inc., or *Dec.*, Per ct.
Av. miles of rail lines operated	9,505.61	9,400.59	1.12
REVENUES.			
Passenger, inc. extra baggage	$35,647,534 18	$33,551,888 82	6.25
Mail and express	4,931,373 25	4,907,899 76	.48
Freight	71,124,459 79	75,710,299 19	*6.06*
Switching, rentals, etc.	1,842,199 30	1,460,088 45	26.17
Total rail lines	$113,545,566 52	$115,630,176 22	*1.80*
Outside operations—revenues	9,731,354 25	10,564,183 91	*7.88*
Total revenues	$123,276,920 77	$126,194,360 13	*2.31*
OPERATING EXPENSES.			
Maint. of way and structures	$16,936,161 78	$16,011,358 02	5.78
Maint. of equipment	14,927,084 90	14,884,062 69	.20
Conducting transportation	40,484,550 06	36,895,635 80	9.73
General expenses	3,657,697 31	3,344,204 86	9.37
Total rail lines	$76,005,494 05	$71,135,261 37	6.85
Outside operation—expenses	8,657,557 84	9,130,070 74	*5.17*
Total expenses	$84,663,051 89	$80,265,332 11	5.48
Gross revenue over total exp	$38,613,868 88	$45,929,028 02	15.93
PASSENGER TRAFFIC			
Revenue passengers carried	41,393,734	41,860,915	*1.12*
Rev. passengers carried 1 mile	1,640,036,373	1,587,837,350	3.29
Rev. pass. trains pr mile road*	$4,175 84	$3,992 77	4.59
Do., do., per *rev. train* mile.*†	$1 94	$1 85	4.87
Av. rev. per pass. per mile	2.174 cts.	2.113 cts.	2.89
Average distance carried	39.62 miles.	37.93 miles.	4.46
FREIGHT TRAFFIC. (Way-Bill Tonnage.)			
Tons rev. & Co. freight carried	28,998,913	29,871,901	*2.92*
Do., carried one mile	7,845,002,515	7,995,891,714	*1.89*
Ton-mls per ml of rd—all frt*	824,251	849,424	*2.96*
Rev. frt. per mile of road*	$7,333 27	$7,893 68	*7.10*
Do., per *revenue train* mile*‡	$3 59	$3 53	1.70
Av. receipts per ton per mile —revenue freight	1.097 cts.	1.098 cts.	
Av. distance carried—all fr'ght	270.53 miles.	267.67 miles.	1.07

*Based on traffic over rail lines only, length of ferries used between rail stations, excluded in distance over which traffic was moved.

†Revenue passenger train and *all* mixed train miles, but excluding mileage of locomotives helping.

‡Revenue freight train and *all* mixed train miles, but excluding mileage of locomotives helping.

NOTE.—Decrease in *italics.*

(*a*) Based on traffic over rail lines only, length of ferries used be-

The following statement shows the increase in the Company's revenues and service during the first half year and the shrinkage caused by the general falling off in business during the second half year.

	Gross Revenues.	Tons of Revenue Freight Carried.	Tons of Revenue freight 1 mile.	Locomotive Miles in Revenue Freight Service including Mixed.	Number of Passengers Carried.	Number of Passengers 1 mile.	Locomotive Miles in Revenue Passenger Service including mixed.
Six months ended Dec. 31, 1907.	$69,104,356 25	13,313,526	3,721,260,980	13,447,424	21,449,664	879,486,214	11,785,955
Six months ended Dec. 31, 1906.	62,129,313 81	12,473,299	3,406,822,517	11,746,008	21,565,576	789,461,618	11,263,344
Increase	$6,975,042 44	840,227	314,438,463	1,701,416	.....	90,024,596	522,611
Decrease	.....	.....	.....	.....	115,912	.....	.....
Per cent.	11.23	6.74	9.23	14.48	0.54	11.40	4.64
Six months ended June 30, 1908.	$54,172,564 52	9,526,878	2,764,959,708	9,467,201	19,944,070	760,550,159	10,737,221
Six months ended June 30, 1907.	64,065,046 32	12,098,193	3,488,417,132	12,845,036	20,295,339	798,375,732	11,312,952
Decrease	$9,892,481 80	2,571,315	723,457,424	3,377,835	351,269	37,825,573	575,731
Per cent.	15.44	21.25	20.74	26.30	1.73	4.74	5.09

tween rail stations excluded in distance over which traffic was moved. (*b*) Revenue passenger train and *all* mixed train miles, but excluding mileage of locomotives helping. (*c*) Revenue freight train and *all* mixed train miles, but excluding mileage of locomotives helping.

The rail lines were operated for 66.94 per cent. of their gross receipts against 61.52 per cent. in 1907. The average for both rail and water lines, including outside operations, was 68.68 per cent. against 63.60 per cent. in 1907. Expenses for "maintenance" were 28.06 per cent. and for "operation" 38.88 per cent. of the gross revenues of the rail lines.

The increase of $4,397,719.78 in operating expenses resulted entirely from the increase in expenses during the six months ended December 31, 1907. In the six months ended June 30, 1908, there was a decrease in operating expenses of $6,225,435.32. The increase in the first half year resulted from the expenses incident to the greater amount of traffic moved, which, in the preceding year, had already reached proportions where it exceeded the limit of handling it economically, from the greater cost of material and supplies—principally fuel, lumber and ties—from the higher wages schedules, and from the expenses incident to restoring to its former standard the roadway damaged by the disastrous floods and heavy snow storms in the spring of 1907.

In the following statements the expenses have been combined under accounts which present them concisely and comparatively with last year.

Maintenance of Way and Structures.

	This Year.	Last Year.	Increase or *Decrease.*
Repairs of roadway and track	$7,235,472.06	$7,420,172.15	*$184,700.09*
Bridges, trestles and culverts	1,501,370.96	1,705,332.26	*203,961.30*
Ties	3,144,080.49	1,615,358.99	1,528,721.50
Rails, frogs, switches and fastenings	1,525,299.72	1,482,215.77	43,083.95
Buildings, grounds and appurtenances	2,543,703.14	2,784,472.44	*240,769.30*
Snow and sand fences and snow sheds	276,992.13	150,919.89	126,072.24
Superintendence	670,191.26	611,064.14	59,127.12
Stationery and printing	26,533.27	23,729.95	2,803.32
Colorado River Crevasse	12,518.75	218,092.43	*205,573.68*
Total	$16,936,161.78	$16,011,358.02	$924,803.76

NOTE.—Decrease in *italics.*

The increase in expenditures for ties resulted from an increase in the average cost of ties from 58 cents to 70 cents per tie (an increase of 20.69 per cent.), and from the greater number of ties put into the track.

The following rails, ties, tie-plates, and continuous rail joints were used in making renewals, and the entire cost thereof charged to operating expenses:

	This year.	Last year.	Increase or *Decrease.*
Miles of new steel rails	303.80	355.20	*51.40*
Per cent. of renewals of all rail in track, including sidings	2.37	2.85	*.48*
Number of burnettized ties	1,234,890	1,196,344	38,546
Number of other ties	2,713,718	1,587,559	1,126,159
Total number of ties	3,948,608	2,783,903	1,164,705
Equal to miles of continuous track	1,410.22	1,005.02	405.20
Per cent of renewals of all ties in track including sidings	11.01	8.06	2.95
Number of tie plates	3,053,358	2,369,693	683,665
Equal to miles of continuous track	545.24	427.74	117.50
Number of continuous rail joints	276.100	137.291	138.809
Equal to miles of continuous track	392.19	195.02	197.17

NOTE.—Decrease in *Italics.*

The weight of rails per yard in main line and branches at the close of the year was as follows:

Miles of main and second track operated, excluding mileage operated under trackage rights.	Total.	141-lb.	96-lb.	90-lb.	80-lb.	76-lb.	75-lb.	70-lb.	61.5-lb.	60-lb.	56-lb.	54-lb.	52-lb.	50-lb.	Less than 50-lb.
Main and second track	5,562.78	0.95	20.62	144.12	2,868.78	171.40	2,084.46	——	195.75	0.95	——	——	——	75.75	——
Branches	4,190.59	—	.37	——	102.48	58.79	238.80	10.72	1,627.08	276.18	253.11	88.72		1,333.57	200.77
Total	9,753.37	0.95	20.99	144.12	2,971.26	230.19	2,323.26	10.72	1,822.83	277.13	253.11	88.72		1,409.32	200.77
Per cent. of total miles of track	100.00	0.01	0.21	1.48	30.46	2.36	23.82	.11	18.69	2.84	2.59	.91		14.45	2.07
Per cent., last year	100.00	—	.22	1.24	31.44	3.33	19.81	.11	19.73	4.26	2.41	.93		14.45	2.07

Expenditures for "Maintenance of Way and Structures" averaged $1,745.96 per mile of main and second track against $1,674.08 for the preceding year

At the wood-preserving plants of the lines east of El Paso, 340,143 lineal feet of piling and 1,724,832 feet B. M. lumber were creosoted, and 640,811 cross ties were burnettized; on the Pacific System lines, 615,781 lineal feet of piling, and 1,585,184 feet B. M. lumber were creosoted, and 1,219,671 cross ties were burnettized.

MAINTENANCE OF EQUIPMENT.

	This Year.	Last Year.	Increase or *Decrease.*
Locomotives	$5,666,704 92	$5,989,492 50	*$322,787 58*
Passenger train cars	1,703,852 63	1,503,692 81	200,159 82
Freight train cars	5,115,757 10	4,934,229 67	181,527 43
Working equipment	365,050 61	345,356 82	19,693 79
Floating equipment	346,620 49	403,327 10	*56,706 61*
Shop machnry. and tools	566,215 47	638,193 53	*71,978 06*
Superintendence	460,411 96	413,507 66	46,904 30
Other expenses	702,471 72	656,262 60	46,209 12
Total	$14,927,084 90	$14,884,062 69	$43,022 21

NOTE.—Decrease in *italics.*

The companies have not made any charge for "Depreciation" of equipment as contemplated by the Interstate Commerce Commission's new accounting regulations, but, as in the past, have charged to operating expenses (less salvage) the original cost (estimated, if not known) or purchase price of all equipment condemned, destroyed, sold, or vacated from any cause during the year. The amount thus charged is shown under the charge to "Renewals" in Table No. 24 and amounted to $1,270,011.76.

The average cost of repairs and renewals per locomotive and per car per annum, and the average number of serviceable locomotives and cars owned during the year were:

	Average Cost Per Annum. This Yr.	Last Yr.	Average Serviceable Number. This Yr.	Last Yr.
Locomotives, for repairs	$3,089 70	$3,443 66		
for renewals	44 54	119 30		
Total	$3,134 24	$3,562 96	1,818	1,692
Passenger train cars, for reps.	$893 80	$789 94		
for rnwls.	71 77	82 31		
Total	$9,65 57	$872 25	1,742	1,700
Freight train cars, for repairs	$92 06	$87 17		
for rnwls.	23 39	26 10		
Total	$115 45	$113 27	44,312	43,562

CONDUCTING TRANSPORTATION.

	This Year.	Last Year.	Increase or *Decrease.*
Locomotives, fuel for	$9,314,822 93	$7,375,948 05	$1,938,874 88
Locomotive service other than fuel	7,462,556 94	7,458,589 29	3,967 65
Train service	5,995,044 07	5,849,433 11	145,610 96
Station and terminal service	11,036,423 89	11,015,354 27	21,069 62
Operating floating equipment	584,353 45	561,043 41	23,310 04
Injuries, loss, damage, and other casualties	3,429,167 58	2,002,801 52	1,426,366 06
Superintendence	1,328,979 45	1,159,951 93	169,027 52
Mileage payments	445,686 76	617,736 00	*$172,049 24*
Advertising & printing	887,514 99	854,778 22	32,736 77
Total	$40,484,550 06	$36,895,635 80	$3,588,914 26

NOTE.—Decrease in *italics.*

The increase in these expenses has been principally in fuel for locomotives resulting from an increase in the cost per ton of coal and fuel oil from $2.13 to $2.70, or about 27 per cent. The increase in injuries, loss, damage, and other casualties resulted principally from the accumulation of freight claims growing out of the difficulty of verifying claims filed following the San Francisco fire and the payment of claims growing out of the congested traffic conditions in the Spring of 1907.

The work done by the transportation department of the rail lines is shown in the following table:

	Increase or *Decrease.*	Per Cent.
Gross operating revenues	*$2,084,609 70*	1.80
Expenses conducting transportation	$3,588,914 26	9.73
Revenue passengers carried one mile	52,199,023	3.29
Mileage of passenger cars	588,320	.44
Locomotive mileage with passenger trains, including helping	*53,120*	.24
Tons of revenue freight carried one mile	*409,018,961*	5.93
Tons of revenue and company freight carried one mile	*150,889,199*	1.89
Mileage of freight cars	*17,664,960*	3.16
Locomotive mileage with freight and mixed trains, including helping	*1,676,419*	6.82
Total locomotive mileage in service for which the attendant expenses are charged to "Conducting Transportation"	*2,946,063*	5.33

NOTE.—Decrease in *italics.*

The cost of fuel per locomotive mile in revenue service and in non-revenue-service, for which the expenses are charged to "Conducting Transportation," was 17.813 cents per mile run against 13.353 cents in the preceding year, and for the entire expenses for "Conducting transportation" 77.420 cents against 66.794 cents in the preceding year.

AVERAGE NUMBER OF TONS OF FREIGHT AND LOADED CARS, PER TRAIN (EXCLUDING CABOOSE), AND THE TONS PER LOADED CAR FOR THE YEAR.

Revenue and Company Freight (Way-Bill Tonnage).	*Tons per Train	(+) Increase (—) Decrease.		Loaded Cars per Train	(+) Increase, (—) Decrease.		Per Cent. of Loaded Car Mileage to Total Car Mileage.	Tons per Loaded Car	(+) Increase, (—) Decrease.	
	Tons.	Tons.	Per Cent.	Cars.	Cars.	Per cent.		Tons.	Tons.	Per cent.
Lines east of El Paso	332.75	—13.10	3.79	15.73	—1.15	6.81	64.69 — 5.21	21.15	0.66	3.23
Lines west of El Paso	448.12	+46.68	11.63	20.79	+ .11	.53	69.06 — 4.46	21.56	+2.14	11.02
Average all lines	403.89	+24.09	6.34	18.83	—0.37	1.93	69.90 — 4.97	21.43	+1.65	8.34

*Ton miles per revenue freight train and all mixed train miles.

GENERAL EXPENSES.

	This Year.	Last Year.	Increase or *Decrease.*
Salaries and expenses of general officers	$433,410 39	$413,220 25	$20,190 14
Salaries and expenses of clerks and attendants	1,838,387 71	1,652,313 55	186,074 16
Law expenses	376,567 96	324,528 08	52,039 88
General office expenses	236,898 96	227,728 55	9,170 41
Stationery and printing	181,359 63	164,896 60	16,463 03
Insurance	354,851 94	370,826 45	*$15,974 51*
Other expenses	236,220 72	190,691 38	45,529 34
Total	$3,657,697 31	$3,344,204 86	$313,492 45

NOTE.—Decrease in *italics.*

GENERAL.

The two remaining notes of the Central Pacific Railroad Company to the United States of America of $2,940,635.78 each, due respectively August 1, 1908, and February 1, 1909, were paid off in July, 1908, releasing Central Pacific Railway Company First Refunding Four Per Cent. Bonds to the amount of $5,882,000, which then became a free asset in the treasury of the Company. These were the last two notes out of 20 notes given in February, 1899, by the Central Pacific Railroad Company to the United States of America in final settlement of the indebtedness of $58,812,715.48, growing out of the issue of bonds by the United States Government in aid of the construction of the Central Pacific and the Western Pacific bond-aided railroads.

The discharge of this debt marks an epoch in the history of the Central Pacific Railroad. By an Act of Congress in 1862, the "Central Pacific Railroad" Company was authorized to build a railroad from Sacramento to a junction with the Union Pacific Railroad, and was given fourteen years to complete the road. This junction was effected in May, 1869, and in the fall of that year the entire rail line from Ogden to San Francisco Bay was in operation. The gross earnings in the year 1870 (the year following the opening of the entire line) amounted to $7,438.970 on the 894 miles operated; and in the year 1899, in which the final settlement with the United States Government and readjustment of the Company's bonded and other indebtedness was effected, the gross earnings amounted to $16,401,026 on the 1,359 miles operated. Since the readjustment of this debt, February 1, 1899, there has been expended to June 30, 1908, in straightening the line, in reducing grades and curvature, and in other reconstruction, in the construction of the Ogden Lucin Cut-Off, referred to in the Annual Report for 1903, and for other betterments and additions by which the service and facilities to the public were increased, the sum of $34,270,680. The gross receipts for the year ended June 30, 1908, for the 1,495 miles of railway operated amounted to $33,456,141.32.

The delivery of the remaining 3,000 refrigerator cars for the "Pacific Fruit Express Company," referred to in the annual report, was completed during the year, and said company now has 6,600 cars in service. The paid-up capital stock of the company is $10,800,000, paid for by the Southern Pacific Company and the Union Pacific Railroad Company, one-half each.

In addition to the completed lines of railway opened for traffic as reported under "Properties and Mileage," and the railways in the Republic of Mexico, heretofore referred to, construction is progressing on the lines of the following companies or of companies organized in their interest, viz.:

Morgan's Louisiana & Texas R. R. & S. S. Co.—On the extension from Lafayette to Port Allen (opposite Baton Rouge) about 29 miles of track and about 12 miles of grading are completed. On the extension from Bayou Sale to South Bend, a distance of about 11 miles, about 7 miles are completed and the grading is completed for the remainder of the line.

Nevada & California Ry. Co.—On the extension from Keeler to Mojave, a distance of about 146 miles, about 36 miles are completed and work on the remaining 110 miles is progressing.

Southern Pacific R. R. Co.—The grading on an extension from San Ramon to Pleasanton, about 10 miles in length, was completed.

Central California Ry. Co.—On this line from Niles to Redwood City, a distance of about 16 miles, about 7 miles of track and about 7 miles of grading are completed, and the grading on the remaining 2 miles is nearing completion.

Sacramento Southern R. R. Co.—On this line from Sacramento to Antioch, a distance of about 54 miles, about 2 miles of track and about 10 miles of grading are completed, and work is progressing on the remainder of the line.

Under the pension system, put into effect by the companies on January 1, 1903, there were carried on the pension rolls 390 employees. The payments to them for the year amounted to $130,-715.61.

The accompanying report of the Comptroller shows fully and in detail the financial and other transactions of the Southern Pacific Company and of the Proprietary Companies.

By order of the Board of Directors,

E. H. HARRIMAN,
President.

No 8.—SOUTHERN PACIFIC COMPANY.

ASSETS.	June 30, 1908.	June 30, 1907.
Capital Assets.		
Stocks and bonds as shown in detail in Tables 9 and 10	$316,565,379.67	$297,273,806.32
Steamships (No. 21)	3,660,259.29	3,660,259.29
Sinking fund (No. 17)	144.00	744.00
	$320,225,782.96	$300,934,809.61
Current Assets.		
Cash	$5,763,465.53	$6,774,616.70
Bills receivable	1,710,489.68	675,820.09
Agents and Conductors	1,825,932.11	2,766,682.23
Dividends and interest accrued to June 30	830,449.71	549,950.03
Individuals and companies	3,232,614.73	2,038,189.19
U. S. Government transportation	2,013,811.14	1,808,377.43
Material, fuel and other supplies	10,541,985.09	9,160,125.08
	$25,918,747.99	$23,773,760.75
Deferred Assets.		
Advances for construction of new lines	$44,310,194.11	$25,996,739.43
Advances for acquisition of new lines and property	11,309,290.94	6,225,550.85
Advances for acquisition of electric lines	5,526,914.13	7,655,705.82
Rolling stock	18,424,446.67	14,849,702.64
Steamships and other floating equipment	7,900,951.96	7,480,244.56
Real estate and other property	15,081,566.27	14,936,236.89
Wood-preserving plants	249,109.75	221,294.54
Individuals and companies	2,390,628.10	705,796.21
Advances for closing Colorado River Crevasse	3,518,152.65	3,152,920.22
	$108,711,254.58	$81,224,191.16
Proprietary Companies.		
Central Pacific Ry. Co.	—	$1,201,852.66
Direct Navigation Co.	$27,813.12	40,578.73
Galveston, Harrisburg & San Antonio Ry. Co.	10,870,265.53	9,560,706.41
Houston and Shreveport R. R. Co.	—	964.72
Houston and Texas Central R. R. Co	686,213.64	897,406.27
Louisiana Western R. R. Co.	40,745.29	—
Morgan's Louisiana & Texas R. R. & S. S. Co.	298,049.96	—
Oregon & California R. R. Co.	7,741,965.77	8,037,638.34
Southern Pacific Terminal Co.	111,458.50	—
	$19,776,511.81	$19,739,147.13
Contingent Assets.		
San Antonio and Aransas Pass Ry. Co.	*$3,981,007.97	$4,053,553.37
Unadjusted accounts, Proprietary Companies	114,490.75	—
	$4,095,498.72	$4,053,553.37
Total assets	$478,727,796.06	$429,725,462.02

* Includes $3,898,000, face value, San Antonio and Aransas Pass Ry. Co. Income Four Per Cent. Bonds, on which interest is payable on January 1, of each year, only if earned, out of net earnings and income.

LIABILITIES.	June 30, 1908.	June 30, 1907.
Capital Liabilities.		
Common stock	$197,849,258.64	$197,849,258.64
Preferred stock	74,863,300.00	39,569,700.00
Preferred stock—subscription receipts outstanding	3,163.00	140.00
Subscriptions to preferred stock	—	16,141,915.25
First mortgage six per cent. steamship bonds, due January 1, 1911	1,786,000.00	1,858,000.00
Four per cent. gold bonds (Central Pacific stock collateral), due August 1, 1949	30,418,500.00	30,218,500.00
Two-five years four per cent. gold bonds, due June 1, 1910, viz.: Authenticated by Trustee $30,000,000 Less in treasury 22,747,000	7,253,000.00	7,253,000.00
	$312,173,221.64	$292,890,513.89
Current Liabilities.		
Coupons matured—unpaid	$125,332.47	$124,207.47
Coupons due July 1	2,888,492.50	2,890,912.50

	June 30, 1908.	June 30, 1907.
Interest accrued on bonds and loans to June 30, but not due	2,234,251.63	2,279,746.98
Dividends due—unpaid	59,764.96	62,946.45
Dividends due July 1, 15, and October 1	8,555,803.97	6,825,794.11
Bonds satisfied of mortgage but not presented	1,000.00	1,000.00
Traffic balances	958,393.76	1,868,115.47
Loans and bills payable	52,472,648.26	24,409,775.00
Vouchers and pay rolls	6,899,476.64	9,867,984.19
	$74,195,164.19	$48,330,482.17
Deferred Liabilities.		
Pacific Mail Steamship Co.	$60,675.22	$502,492.47
Taxes accrued but not due	209,020.63	226,000.00
Wells, Fargo & Co.'s express contract	208,000.00	240,000.00
	$477,695.85	$968,492.47
Proprietary Companies.		
Central Pacific Ry. Co.	$4,238,359.59	—
Houston, East and West Texas Ry. Co.	13,807.99	$517,410.20
Houston and Shreveport R. R. Co.	23,240.27	—
Louisiana Western R. R. Co.	—	2,489,834.05
Morgan's Louisiana & Texas R. R. & S. S. Co.	—	3,899,542.27
Nevada and California Ry. Co.	55,947.02	1,071,530.94
Southern Pacific R. R. Co.	26,597,509.41	40,260,028.81
Southern Pacific Terminal Co.	—	41,021.12
Texas and New Orleans R. R. Co.	621,240.56	630,915.85
	$31,550,104.84	$48,910,283.24
Contingent Liabilities.		
Marine insurance fund	$3,195,687.63	$3,205,677.59
Steamship insurance fund	1,607,697.54	1,607,697.54
Reserve fund for maintenance, renewals, etc.	—	4,178,641.97
Floating equipment replacement fund	3,955,462.65	3,352,134.79
Rolling stock replacement fund	208,462.71	162,041.71
Reserve for depreciation of rolling stock	2,502,164.52	1,923,952.91
Insurance fund	32,630.45	20,234.44
Unadjusted claims and accounts	1,915,918.16	1,711,143.49
Unadjusted accounts, Proprietary Companies	—	97,499.28
Individuals and companies	4,059.28	58,558.79
Principal of deferred payments on land contracts	141,061.62	101,521.80
	$13,563,144.56	$16,419,104.31
Total liabilities	$431,959,331.08	$407,518,876.08
Balance to credit of profit and loss	46,768,464.98	22,206,585.94
Total liabilities	$478,727,796.06	$429,725,462.02

No. 9.—SOUTHERN PACIFIC COMPANY—STOCKS OWNED—JUNE 30, 1908.

PROPRIETARY COMPANIES.*	Total Outstanding June 30, 1908.	Total Owned by Southern Pacific Company.
Carson & Colorado Ry. Co. †	—	—
Central Pacific Ry. Co.—Common	$67,275,500.00	$67,275,500.00
Central Pacific Ry. Co.—Preferred	13,600,000.00	13,600,000.00
Direct Navigation Co.	50,700.00	200.00
Galveston, Harrisburg & San Antonio Ry. Co.	27,084,372.00	27,056,600.00
Houston, East & West Texas Ry. Co.	1,920,000.00	1,918,200.00
Houston & Shreveport R. R. Co.	400,000.00	397,600.00
Houston & Texas Central R. R. Co.	10,000,000.00	9,998,300.00
Louisiana Western R. R. Co.	3,360,000.00	3,360,000.00
Morgan's Louisiana & Texas R. R. & S. S. Co.	15,000,000.00	15,000,000.00
Nevada & California R. R. Co.	4,425,700.00	4,425,700.00
Oregon & California R. R. Co.—Common	7,000,000.00	6,970,198.50
Oregon & California R. R. Co.—Preferred	12,000,000.00	11,991,000.00
South Pacific Coast Ry. Co.	6,000,000.00	6,000,000.00
Southern Pacific R. R. Co.	160,000,000.00	160,000,000.00
Southern Pacific Terminal Co.	2,000,000.00	1,999,600.00
Texas & New Orleans R. R. Co.	5,000,000.00	4,999,500.00
Total Proprietary Companies.	$335,116,272.00	$334,992,398.50
OTHER COMPANIES.		
Beaver Hill Coal Co.	$500,000.00	$500,000.00
Cananea, Yaqui River & Pacific R. R. Co.	‡2,500,000.00	‡2,500,000.00
Central California Ry. Co.	30,000.00	30,000.00
Coast Line Ry. Co.	100,000.00	100,000.00
Coos Bay, Roseburg & Eastern R. R. & Navigation Co.	2,000,000.00	2,000,000.00
Gila Valley, Globe & Northern Ry. Co.	2,000,000.00	2,000,000.00
Goose Lake & Southern Ry. Co.	406,000.00	406,000.00
Independence & Monmouth R. R. Co.	25,000.00	12,750.00
Inter-California Ry. Co.	216,000.00	216,000.00
Lincoln Northern Ry. Co.	11,200.00	11,200.00
Los Angeles Ry. Co.	5,000,000.00	2,250,000.00
Maricopa & Phoenix R. R. Co. (Organized January 10, 1908)	1,000,500.00	1,000,500.00
Merced Cañon Ry. Co.	100,000.00	50,000.00
Mexican International R. R. Co.	—	4,172,100.00
Northwestern Pacific R. R. Co.	35,000,000.00	17,500,000.00
Oroville & Nelson R. R. Co.	13,000.00	13,000.00
Pacific Electric Ry. Co.	20,000,000.00	10,000,000.00
Pacific Fruit Express Co.	10,800,000.00	5,400,000.00
Pacific Mail Steamship Co.	20,000,000.00	10,010,000.00
Rubicon Water & Power Co.	500,500.00	500,500.00
Sacramento Southern R. R. Co.	100,000.00	100,000.00
San Bernardino & Redlands R. R. Co.	200,000.00	200,000.00
San Francisco & Napa Ry. Co.	55,000.00	55,000.00
Southern Pacific Co.—Common	197,849,258.64	82,153.34
Southern Pacific Co.—Preferred	74,866,463.00	106,598.00
Sunset R. R. Co.	500,000.00	250,000.00
Wells, Fargo & Co.'s Express	8,000,000.00	1,530,000.00
Stocks of Oil Companies	—	18,337,336.40
Stocks of Land and Town Sites Cos.	—	106,666.66
Stocks of Miscellaneous Companies	—	898,620.00
Total Other Companies	—	$80,338,424.40
Total	—	$415,330,822.90
Asia Steamship Co.	£100	£100
Persia Steamship Co.	£100	£100

* Companies whose revenues and expenses, transportation and traffic statistics are embraced in the accompanying statements for "Proprietary Companies." †Stock amounting to $4,389,000 held in 1907 was exchanged for a like amount of capital stock of the Nevada & California Railway Co. ‡Mexican currency.

No. 10.—SOUTHERN PACIFIC COMPANY—BONDS OWNED—JUNE 30, 1908.

PROPRIETARY COMPANIES.*	Total Outstanding June 30, 1908.	Total owned by Southern Pacific Company
Carson & Colorado Ry. Co. first mortgage 4 per cent.	$2,000,000.00	$2,000,000.00
Central Pacific Ry. Co. first refunding mortgage 4 per cent.	93,919,000.00	12,203,000.00
Central Pacific Ry Co. 3½ per cent. mortgage	16,611,000.00	2,000.00
Central Pacific Ry. Co. Through Short Line, first mortgage 4 per cent.	9,199,000.00	899,000.00
Galveston, Harrisburg & San Antonio Ry. Co. second mortgage, Eastern Division 6 per cent.	1,000,000.00	374,000.00
Galveston, Harrisburg & San Antonio Ry. Co. equipment 6 per cent.	1,558,000.00	1,558,000.00
Galveston, Harrisburg & San Antonio Ry. Co. second mortgage, M. & P. Extension 6 per cent.	6,354,000.00	1,110,000.00
Galveston, Houston & Northern Ry. Co. first mortgage 5 per cent.	800,000.00	800,000.00
Gulf, Western Texas & Pacific Ry. Co. first mortgage 5 per cent.	2,224,000.00	2,224,000.00
Houston & Shreveport R. R. Co. first mortgage 6 per cent.	150,000.00	150,000.00
Houston & Texas Central R. R. Co. Lampasas Extension, first mortgage 5 per cent.	450,000.00	450,425.00
New York, Texas & Mexican Ry. Co. first mortgage, Matagorda Division, 6 per cent.	842,000.00	548,000.00
Oregon & California R. R. Co. first mortgage 5 per cent.	17,745,000.00	32,000.00
Southern Pacific R. R. Co. first consolidated mortgage 5 per cent. of 1893	4,127,500.00	243,000.00
Southern Pacific R. R. Co. first mortgage 6 per cent. of 1875	5,111,000.00	15,000.00
Southern Pacific R. R. Co. first refunding mortgage 4 per cent.	88,489,000.00	7,332,000.00
Texas & New Orleans R. R. Co. first mortgage, Main Line, 6 per cent.	862,000.00	561,000.00
Texas & New Orleans R. R. Co. first mortgage, Dallas Division, 4 per cent.	3,997,000.00	1,190,000.00
Texas & New Orleans R. R. Co. equipment 6 per cent.	612,000.00	612,000.00
Total Proprietary Companies.	$256,050,500.00	$32,278,000.00
OTHER COMPANIES.		
Associated Oil Co. first mortgage 5 per cent.	$2,833,000.00	$750,000.00
Calexico School District 6 per cent.	—	3,000.00
Coos Bay, Roseburg & Eastern R. R. Nav. Co. first mortgage 6 per cent	625,000.00	625,000.00
Los Angeles Interurban Ry. Co. first mortgage 5 per cent.	—	4,510,000.00
Los Angeles Pacific Co. first mortgage 5 per cent.	—	765,000.00
Mexican Consolidated Public Debt 3 per cent	—	†252,300.00
Northwestern Pacific R. R. Co. first refunding mortgage 4½ per cent.	5,694,000.00	5,694,000.00
Northern Pacific Terminal Co. first mortgage 6 per cent.	—	5,000.00
Pacific Electric Ry. Co. first mortgage 5 per cent.	—	770,000.00
Riverside & Arlington R. R. Co. first mortgage 4 per cent.	—	140,000.00
San Jose-Los Gatos Interurban Ry. Co. first mortgage 5 per cent.	—	50,000.00
Silsbee School District 6 per cent.	—	3,000.00
Southern Pacific Co. (C. P. Stock Collateral) 4 per cent.	30,418,500.00	1,649,000.00
Sunset R. R. Co. first mortgage 4 per cent.	316,000.00	158,000.00
Bonds of other companies	—	3,002,000.00
Total Other Companies.	—	$18,376,300.00
Total Bonds	—	$50,654,300.00
Total Stocks (Table No. 9)	—	415,330,822.90
Total Stocks and Bonds	—	$465,985,122.90

*Companies whose revenues and expenses, transportation and traffic statistics are embraced in the accompanying statements for "Proprietary Companies."
†Mexican Currency.